

AD-A105 843

ERDMAN ANTHONY ASSOCIATES ROCHESTER NY
NATIONAL DAM SAFETY PROGRAM. TISCHUA CREEK WATERSHED DAM NUMBER --ETC(U)
AUG 81 R J FARRELL

F/8 13/13

DACW51-81-C-0017
NL

UNCLASSIFIED

END
DATE
FILED
-R
DTIC

LEVEL II

2

AWA105843

DTIC
ELECTE
OCT 20 1981

S

D

D

DIC FILE COPY

THIS DOCUMENT IS BEST QUALITY PRACTICABLE.
THE COPY FURNISHED TO DDC CONTAINED A
SIGNIFICANT NUMBER OF PAGES WHICH DO NOT
REPRODUCE LEGIBLY.

DISTRIBUTION STATEMENT A

Approved for public release
Distribution Unlimited

DISCLAIMER NOTICE

**THIS DOCUMENT IS BEST QUALITY
PRACTICABLE. THE COPY FURNISHED
TO DTIC CONTAINED A SIGNIFICANT
NUMBER OF PAGES WHICH DO NOT
REPRODUCE LEGIBLY.**

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM	
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER	
	AD-A705	843	
4. TITLE (and Subtitle) Phase I Inspection Report Ischus Creek Watershed Dam #2, Cattaraugus County, NY Inventory No. 560		5. TYPE OF REPORT & PERIOD COVERED Phase I Inspection Report National Dam Safety Program	
7. AUTHOR(s) 10 ROBERT J. FARRELL		8. CONTRACT OR GRANT NUMBER(s) 15 DACW51-81-C-0917	
9. PERFORMING ORGANIZATION NAME AND ADDRESS Erdman, Anthony, Associates 242 Andrews Street, P.O. Box 9589 Rochester, New York 14604		10. PROGRAM ELEMENT PROJECT, TASK AREA & WORK UNIT NUMBERS 12 87	
11. CONTROLLING OFFICE NAME AND ADDRESS Department of the Army 26 Federal Plaza New York District, CoE New York, New York 10287		12. REPORT DATE 18 August 1981	
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office) Department of the Army 26 Federal Plaza New York District, CoE New York, NY 10287		13. NUMBER OF PAGES 11	
		15. SECURITY CLASS. (of this report) UNCLASSIFIED	
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE	
16. DISTRIBUTION STATEMENT (of this Report) Approved for public release; Distribution unlimited.			
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report) 6 National Dam Safety Program. Ischua Creek Watershed Dam Number 2 (Inventory Number N.Y. 560), Allegheny River Basin, Cattaraugus County, New York. Phase I Inspection Report.			
18. SUPPLEMENTARY NOTES			
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Dam Safety National Dam Safety Program Visual Inspection Hydrology, Structural Stability Ischua Creek Watershed Dam #2 Cattaraugus County Allegheny River Basin			
21. ABSTRACT (Continue on reverse side if necessary and identify by block number) This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization. Examination of available documents and visual inspection of Ischua Creek Watershed Dam No. 2 and appurtenant structures did not reveal conditions which constitute a hazard to human life or property. However, the dam has some deficiencies which require further investigation and remedial action.			

Drainage gullies were observed across the emergency spillway and emanating from the downstream east toe of the embankment. In addition, a bulge or slough was observed in the upper portion of the downstream east slope. It is recommended that these conditions be evaluated further by a qualified registered professional engineer.

Using the Corps of Engineers screening criteria for review of spillway adequacy, it has been determined that the dam would not be overtopped under full PMF conditions. The PMF routed through the reservoir required 97 percent of the spillway outflow capacity. The spillway is, therefore, judged to be adequate.

The investigations recommended should be completed within 12 months of notification to owner, and remedial actions resulting from these investigations completed in the subsequent 12 months.

The following remedial measures should be performed within 1 year of notification to owner:

- construct a gate well for the drain gate, extend the gate stem to the top of the riser structure and install rungs on the riser structure to provide access.
- debris and vegetation should be cleared from the trash racks, downstream channel, outlet basin, auxiliary spillway channel and embankment surfaces periodically. A program of periodic mowing and cutting of the embankment and outlet channels should be provided.
- provide a program of periodic inspection and maintenance of the dam and appurtenances including yearly operation and lubrication of the gate systems. Document this information for future reference.
- develop a formal written downstream warning system to alert the appropriate officials and residents in the event of an emergency.

Accession For	
NTIS GRA&I	<input checked="" type="checkbox"/>
DTIC TAB	<input type="checkbox"/>
Unannounced	<input type="checkbox"/>
Justification	
By	
Distribution/	
Availability Codes	
Dist	Avail and/or Special
A	23 CP

OCT 20 1981
D

ALLEGHENY RIVER BASIN

**ISCHUA CREEK WATERSHED
DAM No. 2**

**CATTARAUGUS COUNTY, NEW YORK
INVENTORY No. N.Y. 560**

**PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM**



NEW YORK DISTRICT, CORPS OF ENGINEERS

AUGUST 1981

**APPROVED FOR PUBLIC RELEASE;
DISTRIBUTION UNLIMITED**

PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I Investigation; however, the Investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through frequent inspections can unsafe conditions be detected and only through continued care and maintenance can these conditions be prevented or corrected.

Phase I Inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test Flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event a finding that a spillway will not pass the Test Flood should not be interpreted as necessarily posing a highly inadequate condition. The Test Flood provides a measure of relative spillway capacity and serves as an aid in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

TABLE OF CONTENTS

		<u>PAGE</u>
OVERVIEW PHOTO		
LOCATION MAP		
SECTION 1	PROJECT INFORMATION	
1.1	General	1-1
1.2	Description of Project	1-1
1.3	Pertinent Data	1-5
SECTION 2	ENGINEERING DATA	
2.1	Geology	2-1
2.2	Subsurface Investigation	2-1
2.3	Design Records	2-1
2.4	Construction Records	2-1
2.5	Operation Records	2-1
2.6	Evaluation of Data	2-1
SECTION 3	VISUAL INSPECTION	
3.1	Findings	3-1
3.2	Evaluation	3-2
SECTION 4	OPERATIONAL PROCEDURES	
4.1	Procedures	4-1
4.2	Maintenance of Dam	4-1
4.3	Warning System in Effect	4-1
4.4	Evaluation	4-1

TABLE OF CONTENTS - con't.

		<u>PAGE</u>
SECTION 5	HYDRAULICS/HYDROLOGY	
5.1	Drainage Area Characteristics	5-1
5.2	Design Data	5-1
5.3	Analysis Criteria	5-1
5.4	Reservoir Capacity	5-2
5.5	Experience Data	5-2
5.6	Overtopping Potential	5-2
5.7	Analysis of Downstream Impacts	5-2
5.8	Evaluation	5-2
SECTION 6	STRUCTURAL STABILITY	
6.1	Visual Observations	6-1
6.2	Design and Construction Data	6-1
6.3	Post Construction Changes	6-1
6.4	Seismic Stability	6-1
SECTION 7	ASSESSMENT, RECOMMENDATIONS AND REMEDIAL MEASURES	
7.1	Dam Assessment	7-1
7.2	Recommended Measures	7-1
<u>APPENDICES</u>		
APPENDIX A	INSPECTION CHECKLIST	A-1
APPENDIX B	ENGINEERING DATA	B-1
APPENDIX C	PHOTOGRAPHS	C-1
APPENDIX D	HYDROLOGIC AND HYDRAULIC COMPUTATIONS	D-1
APPENDIX E	INFORMATION AS CONTAINED IN <u>THE NATIONAL INVENTORY OF DAMS</u>	E-1

**PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM**

Name of Dam: Ischua Creek Watershed
Dam No. 2

State Located: New York

County Located: Cattaraugus

Stream: Johnson Creek

Basin: Allegheny River

Date of Inspection: April 2, 1981

ASSESSMENT

↙ Examination of available documents and visual inspection of Ischua Creek Watershed Dam No. 2 and appurtenant structures did not reveal conditions which constitute a hazard to human life or property. However, the dam has some deficiencies which require further investigation and remedial action.

Drainage gullies were observed across the emergency spillway and emanating from the downstream east toe of the embankment. In addition, a bulge or slough was observed in the upper portion of the downstream east slope. It is recommended that these conditions be evaluated further by a qualified registered professional engineer.

Using the Corps of Engineers screening criteria for review of spillway adequacy, it has been determined that the dam would not be overtopped under full PMF conditions. The PMF routed through the reservoir required 97 percent of the spillway outflow capacity. The spillway is, therefore, judged to be adequate.

The investigations recommended should be completed within 12 months of notification to owner, and remedial actions resulting from these investigations completed in the subsequent 12 months.

The following remedial measures should be performed within 1 year of notification to owner:

- construct a gate well for the drain gate, extend the gate stem to the top of the riser structure and install rungs on the riser structure to provide access.

- debris and vegetation should be cleared from the trash racks, downstream channel, outlet basin, auxiliary spillway channel and embankment surfaces periodically. A program of periodic mowing and cutting of the embankment and outlet channels should be provided.

- provide a program of periodic inspection and maintenance of the dam and appurtenances including yearly operation and lubrication of the gate systems. Document this information for future reference.

- develop a formal written downstream warning system to alert the appropriate officials and residents in the event of an emergency.

Approved by:

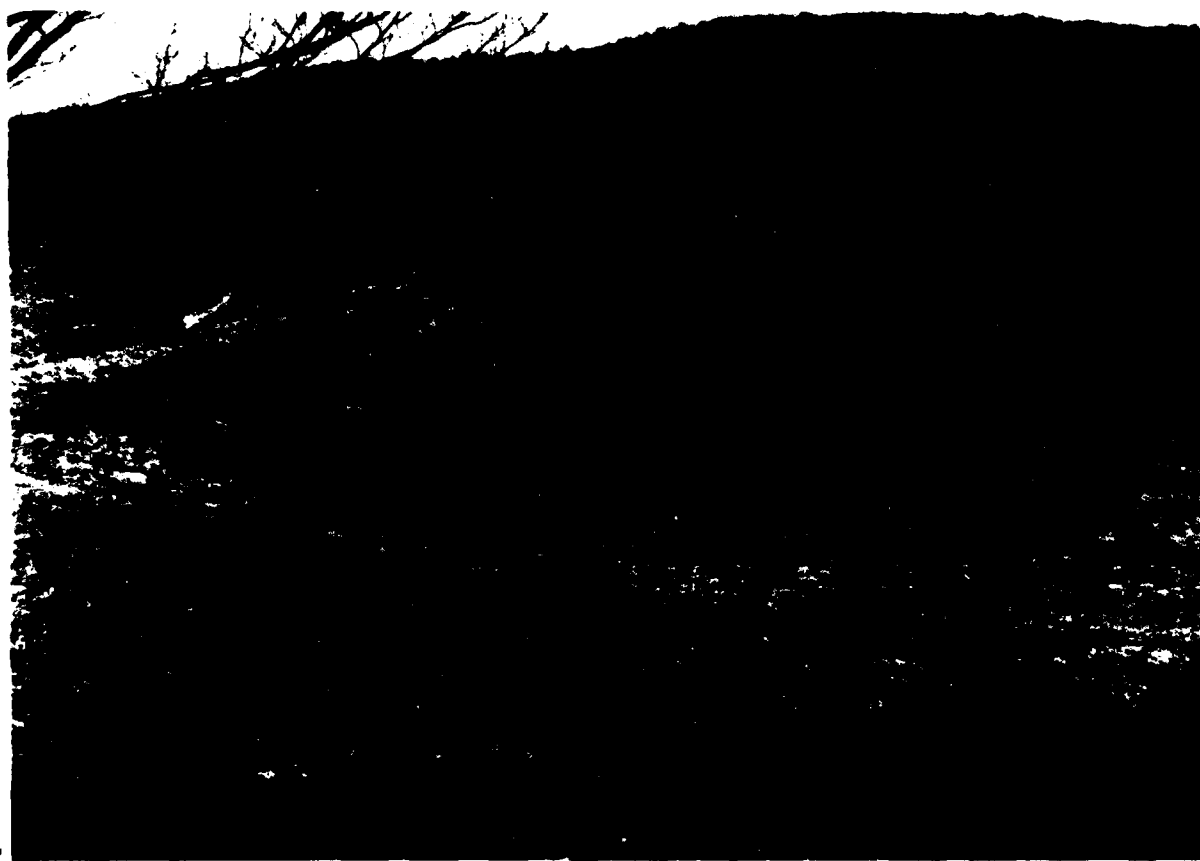
Date:

Robert J. Farrell
Robert J. Farrell, P.E.
New York No. 55983

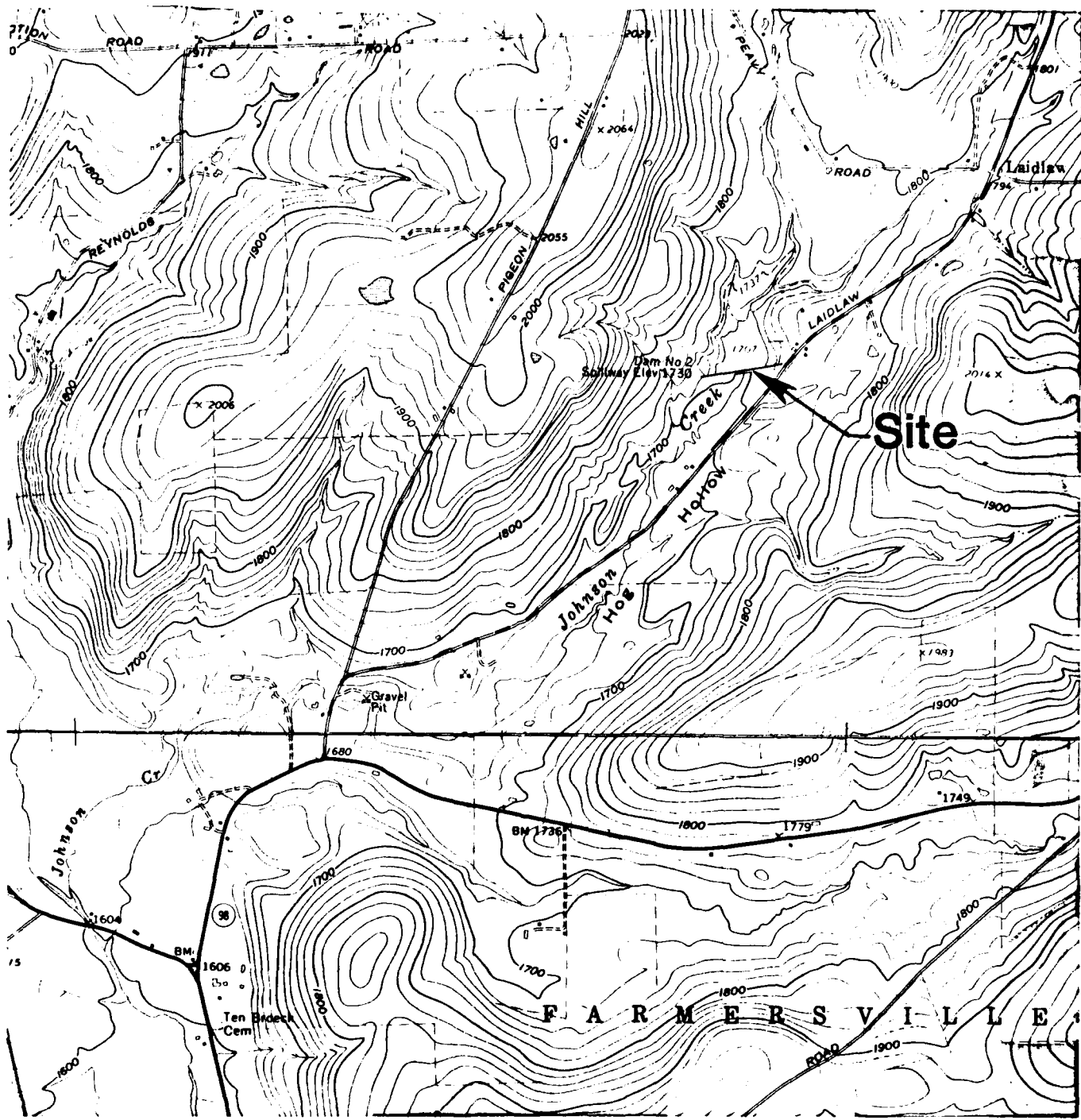
W.M. Smith, Jr.
Col. W.M. Smith, Jr.
New York District Engineer

18 Aug 81

**Ischua Creek Watershed
Dam No. 2**



OVERVIEW



**Ischua Creek Watershed
Dam No. 2**

LOCATION PLAN

Scale: 1:2000

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
ISCHUA CREEK WATERSHED DAM NO. 2

SECTION 1 - PROJECT INFORMATION

1.1 GENERAL

a. Authority

The Phase I inspection reported herein was authorized by the New York District Corps of Engineers in a letter dated 24 February 1981, in fulfillment of the requirements of the National Dam Inspection Act, Public Law 92-367, dated 8 August 1972.

b. Purpose of Inspection

This inspection was conducted to evaluate the existing conditions of the dam, to identify deficiencies and hazardous conditions, to determine if these deficiencies constitute hazards to life and property, and to recommend remedial measures where required.

1.2 DESCRIPTION OF THE PROJECT

a. Location

The Ischua Creek Watershed Dam No. 2 is located on Johnson Creek approximately 4 miles northeast of Franklinville, New York. It can be reached from Laidlaw Road which intersects State Rt 98 about 1.5 miles to the south. The dam is shown on U.S.G.S Delevan, New York quadrangle with coordinates approximately at N42° 23' 32", E 78° 25' 15" (see location plan). Page B-4 of Appendix B is a site plan for this dam.

b. Description of Dam and Appurtenances

The dam consists of a zoned earthfill embankment with an earthfill cutoff trench below; a principal spillway with a reinforced concrete riser structure and outlet pipe; and a vegetated earth channel emergency spillway located to the right of the dam embankment. The length of the dam embankment is approximately 1400 ft. The emergency spillway is 140 ft. wide at the control section.

1) Dam Embankment

The core of the embankment is constructed of semi-pervious silty sand and gravel. The core is surrounded by sand and gravel shells. The dam is approximately 1400 ft. long and a maximum of 42 ft. high. The toe of the downstream slope is constructed of rock fill.

The upstream slope is 3 horizontal to 1 vertical and the downstream slope is 2.5 horizontal to 1 vertical. The crest width is 14 ft. There are berms on the upstream slope approximately 8 ft. wide. The lower berm on the upstream slope extends the full length of the dam at elevation 1706.0 ft. (MSL). The upper berm on the upstream slope is at elevation 1721.0 ft. (MSL). It also extends the full length of the dam. The purpose of these berms is wave erosion protection.

Beneath the embankment is an earthfill cutoff trench which is 14 ft. wide at the bottom. According to available plans, it is constructed of the same material as the semi-pervious core.

The dam is founded on silty sand and gravel (designated GM using the Unified Soil Classification System).

2) Emergency Spillway

The emergency spillway is cut into silty sand and gravel in the west abutment. A diversion berm of compacted fill has been constructed on the east side of the channel. It has side slopes of 3 horizontal to 1 vertical. The grass covered channel curves around the west end of the dam embankment.

The control section is 140 ft. wide and 30 ft. long and the downstream channel is roughly 700 ft. long.

3) Principal Spillway

The principal spillway consists of a reinforced concrete drop inlet structure with a sluice gate controlled inlet pipe and a 36 in. outlet pipe supported on a concrete cradle.

The inside dimensions of the riser structure are 26 ft. high and 9 ft. wide normal to the axis of the dam. It is 3 ft. long parallel to the embankment and flares to 12 ft. long at the top. The walls of the structure are 12 in. thick. The structure is founded on a 7.3 ft. by 14.3 ft. spread footing.

The "low stage inlet" is an uncontrolled opening approximately 11 ft. above the sluice gate invert. It is 20 in. wide and 7 in. high and is located on the east side of the riser. The water flows over this orifice and drops into the riser structure. It is protected by a trash rack assembly approximately 3.7 ft. high and 2.5 ft. wide. This assembly is fabricated from galvanized steel angle sections.

The "high stage inlet" consists of two openings approximately 25 ft. above the sluice gate invert. They are 9 ft. wide and 12 in. high and are located in the left and right sides of the flared portion of the riser structure. They are protected by galvanized 3 steel tubes placed in the sloping section below each opening. A 30 in. diameter manhole permits access into the riser structure.

The riser structure is drained by a 36 in. diameter reinforced concrete pressure pipe. It is 222 ft. long and drops approximately 2 ft. over that length. The pipe penetrates the downstream side of the riser structure and is supported by a 9 in. thick concrete cradle within the embankment. Plans indicate 6 reinforced concrete antiseep collars cast around the pipe within the embankment.

The downstream end of the conduit extends approximately 8 ft. downstream of the embankment. The pipe is supported by a reinforced concrete bent 8 ft. by 8 ft. square and 12 in. thick. The discharge conduit outlets into a stone lined plunge pool.

4) Reservoir Drain Inlet

At the base of the structure is an 8 in. diameter, vertical lift, sluice gate inlet which is controlled by a wheel and stem. An 8 in. bitumenous coated corrugated metal pipe extends 40 ft. upstream from the lift gate into the impoundment pool. Plans indicate 26 in. diameter vertical metal pipe at the upstream end of the pipe with a perforated plate across the open end to prevent trash from entering.

5) Foundation and Embankment Drainage

A 4 ft. wide trench drain is located below the downstream slope approximately 80 ft. downstream of the centerline of the dam. This drain outlets into the rock fill toe of the downstream slope.

c) Size Classification

The dam's height of 42 ft. places it in the INTERMEDIATE size category according to the Corps of Engineers' Recommended Guidelines.

d) Hazard Potential Classification

The hazard potential classification for this dam is HIGH because of the significant economic losses and high potential for loss of life downstream in the event of dam failure. Section 5 of this report presents more detailed discussion of the hazard potential.

e) Ownership

The dam is owned and operated by:

Chattaraugus County
James M. Cash - Chairman of Oversight Committee
RD #2
Maple Grove Road
Franklinville, New York 14737
Tele: (716) 767-3604

f) Purpose of Dam

The purpose of this dam is to reduce downstream flooding by providing temporary storage for the runoff from 1792 acres. The temporary storage is released gradually through the two-stage principal spillway system.

g) Design and Construction History

The dam was built under the Watershed Protection and Flood Prevention Act by the Ischua Creek County Small Watershed Protection District with the assistance of the Soil Conservation Service. It was completed in 1961.

h) Normal Operating Procedures

The dam is normally self-regulating.

1.3 Pertinent Data

a. Drainage Area

The drainage area for this dam covers 2.8 square miles. It is made up primarily of rolling pasture and woodland and minor development.

b. Discharge at Dam Site

1) Outlet Works

Normal discharge at the site is through the 36 in. diameter outlet pipe. In the event of severe flooding, water would flow over the emergency spillway at elevation 1729.5 ft. (MSL). The invert of the low stage orifice is at elevation 1706.5 ft. (MSL). The invert of the high stage orifice is at elevation 1721.0 ft. (MSL)

2) Maximum Known Flood

There is no data available for the maximum known flood at dam site. Evidence of recent high water was observed at elevation 1720.0 ft. (MSL).

3) Ungated Spillway Capacity at Top of Dam

The capacity of the principal spillway with the reservoir at top of dam elevation 1735.2ft. (MSL) is 195 cfs. The capacity of the emergency spillway is 6396 cfs at this level.

4) Ungated Spillway Capacity at Test Flood

The capacity of the principal spillway with the reservoir at test flood elevation (1735.1 ft. MSL) is 195 cfs. The capacity of the emergency spillway is 6196 cfs at this level.

5) Gated Spillway Capacity at Normal Pool

There are no gated spillways.

6) Gated Spillway Capacity at Test Flood

As previously mentioned, there are no gated spillways.

7) Total Spillway Capacity at Test Flood

The total spillway capacity at test flood elevation (1735.1 ft. MSL) is 6391 cfs.

c) Elevation (ft. above NGVD)

- 1) Streambed at toe of dam: 1693.0
- 2) Bottom of cutoff: variable, approximately 1692 minimum
- 3) Maximum tailwater - unknown, outlet conduit invert 1694
- 4) Normal pool: 1706.5
- 5) Full flood control pool: 1729.5

- 6) Spillway crest - Pond Drain Inlet: 1697.0
 Low Level Orifice: 1706.5
 High Level Orifice: 1721.0
 Emergency Spillways: 1729.5
- 7) Design surcharge (original design): 1732.7
- 8) Top of dam: 1735.2
- 9) Test flood surcharge: 1735.1
- d) Reservoir (Length in feet)
 - 1) Length of maximum pool: 2200[±]
 - 2) Length of normal pool: 600[±]
 - 3) Length of flood control pool: 2100[±]
- e) Storage (acre-feet)
 - 1) Normal pool: 25.0
 - 2) Flood control pool: 440
 - 3) Spillway crest pool
 - a) Low stage inlet: 25
 - b) High stage inlet: 215
 - c) Emergency spillway: 440
 - 4) Test Flood: 643
 - 5) Top of Dam: 647
- f) Reservoir Surface (acres)
 - 1) Normal pool: 7.0
 - 2) Flood control pool: 32.5
 - 3) Spillway crest pool
 - a) Low stage inlet: 7.0
 - b) High stage inlet: 22.0
 - c) Emergency spillway: 32.5
 - 4) Test flood: 40.9
 - 5) Top of dam: 41.0
- g) Dam
 - 1) Type: Earth Embankment
 - 2) Length: 1400
 - 3) Height: 42 ft.
 - 4) Top Width: 14 ft.
 - 5) Side Slopes:
 - Upstream: 3H: 1V
 - Downstream: 2.5H:1V

- 6) Zoning: Semi-pervious core of silty sand and gravel, sand and gravel shells, rock fill downstream toe, blanket type seepage drain under downstream embankment
- 7) Impervious Core: Semi-pervious silty sand and gravel
- 8) Cutoff: 14 ft. width, earthfill
- 9) Grout Curtains: None
- h) Diversion and Regulating Tunnel
Not applicable
- i) Spillways
 - 1. Type:
 - a) Principal Spillway: Reinforced concrete drop inlet
 - b) Emergency Spillway: Grass covered earth channel cut in right abutment
 - 2. Length of Weir:
 - a) Low Level Orifice: 20 in.
 - b) High Level Orifice: 18 ft.
 - c) Emergency Spillway: 140 ft.
 - 3. Crest Elevation: (feet above NGVD)
 - a) Low Level Orifice: 1706.5
 - b) High Level Orifice: 1721.0
 - c) Emergency Spillway: 1729.5
 - 4. Gates: 8 inch diameter vertical lift sluice gate on reservoir drain inlet
 - 5. Upstream Channel: Johnson Creek, narrow stream to reservoir through farm and woodland
 - 6. Downstream Channel: Johnson Creek, narrow stream through rolling farm and woodland
- j) Regulating Outlet: None

SECTION 2 - ENGINEERING DATA

2.1 GEOLOGY

Bedrock at the dam site is Upper Devonian Age (345-375 million years ago) interbedded shales and siltstones known as the Canadaway Group. These relatively flat lying and underformed rocks are thin to medium bedded and typically slightly weathered. Regionally the rocks form a homocline dipping southward to southwestward at approximately 40 feet per mile. Small terraces and low folds locally modify this dip to essentially flat-lying over short distances. Only minor folding and faulting are found in the region with no major or active faults known to exist.

The Ischua Creek Watershed Dam No. 2 is in a region classified as Zone 2 seismicity, as shown on Figure No. 1 of the Recommended Guidelines for Safety Inspection of Dams.

Pleistocene glaciation (beginning approximately 2 million years ago) has modified topography by means of erosion and deposition. The thick continental ice sheet advanced southward from Quebec and Ontario smoothing terrain with glacial scour and mantling uplands with till deposits. The pleistocene geology of the dam site consists of glacial end moraine deposits. Generally coarse gravel deposits with abundant boulder material overlay a dense silty clay glacial till, deposited by melting of ice at the edge of the ice sheet during a still stand in the advancement of the continental glacier. Recent alluvial silts and sands deposited on the glacial material via upland erosion is also common.

2.2 SUBSURFACE INVESTIGATION

Test hole logs are contained in the "As-Built" drawings. A total of 5 test pits and 4 drill holes were dug to determine subsurface conditions. The logs show that the dam is founded on glacial till at the north abutment and on silty sand and gravel in the center and south abutments.

2.3 DESIGN RECORDS

The records available for the project consists of 9 contract drawings which show the plans, sections and details of the dam, appurtenant structures, impact basin details and grating, fencing details, and logs of test holes; and a design report issued by the U.S. Soil Conservation Service dated April 5, 1961.

2.4 CONSTRUCTION RECORDS

Construction records and specifications are available at the U.S. Soil Conservation Service, Design Section, Syracuse, N.Y.

The sedimentation basin structure shown on Page 2 of the "As-Built" drawings was not found during the visual inspection.

2.5 OPERATION RECORDS

No written maintenance or operation records exist for the dam

2.6 EVALUATION OF DATA

Information obtained from the "As-Built" drawings is consistent with observations made during this inspection. The information obtained from available data was considered adequate for the Phase I inspection and evaluation.

SECTION 3 - VISUAL INSPECTION

3.1 Findings

a) General

The Ischua Creek Watershed Dam No. 2 is in good condition at the present time.

b) Dam

1) Earth Embankment (See Photo 5)

The earth embankment is generally in good condition at the present time. Small (1 in. x 1 in.) eddy current type erosion gullies were noted over most of the embankment. Animal burrows were noted at approximately 10 ft. above the downstream toe at 100 ft. and 250 ft. to the left of the right abutment. Five animal burrows were noted to the right of the outlet pipe and erosion gullies up to 6 in. deep extended from these burrows to the outlet channel. It is possible that these burrows intercept the seepage drain causing a concentration of flow at this location. This should be investigated.

A small bulge in the slope was noted approximately 10 ft. below the crest and 100 ft. east of the outlet pipe in the downstream slope. Two animal burrows were noted at this location and the slough may be the result of animal activity.

The crest of the dam is in good condition with no evidence of vertical or horizontal movement.

There is no slope protection on the upstream slope other than the vegetative cover and a 10 ft. berm at the water line. Approximately 2 to 4 in. of erosion due to wave action was noted at the water line on the upstream slope.

The trench type toe drain under the downstream slope appears to be functioning properly as no seepage was noted at the dam. The wet area downstream of the left side is believed to be caused by natural groundwater and the recent spring thaw.

2) Emergency Spillway (See Photo 6)

The emergency spillway is generally in good condition at the present time. There is an area at the upstream end of the channel where heavy surface runoff emanating from the adjacent natural slope has cut erosion gullies across the channel. These gullies are up to 3 ft. deep and 4 ft. across. A drainage path should be provided to allow this area to drain without eroding the spillway channel.

Animal burrows were noted in the slope of the diversion dike located along the left side of the channel. These are approximately 150 ft. downstream of the control section.

c) Principal Spillway

1) Drop Inlet Structure (See Photos 1 and 2)

The structure is in good condition with no evidence of spalling, cracking, or efflorescence. The trash racks are in good condition. The stem of the reservoir drain gate is located on the north outside wall of the riser structure. The top of the stem was approximately 1.0 ft. above the water surface at the time of observation. The gate was inaccessible and could not be tested. The design drawings (Page B-10) indicate that a gate well was to have been constructed out of a half section of 48 in. bituminous coated corrugated metal pipe, and that the stem was to be extended all the way to the top of the riser.

d) Reservoir Area (See Photo 1)

The shore of the reservoir is generally shallow sloping pasture or woodland. It appears to be stable and in good condition.

e) Downstream Channel (See Photo 4)

The downstream channel is a narrow channel passing over rolling terrain. There is rip rap protection of the plunge pool, but erosion of the banks has taken place above the rip rap.

3.2 Evaluation

The dam is generally in good condition. The potential problems noted during the visual inspection are listed below.

- a) Drainage gullies on the upstream end of the emergency spillway
- b) Animal burrows in the emergency spillway diversion dike and the downstream slope
- c) Erosion of the downstream channel banks above the level of the rip rap
- d) Apparent sloughing of the downstream slope to the east of the outlet structure.

- e) Drainage gullies emanating from the animal burrows near the downstream toe to the left of the outlet.
- f) Inadequate length of stem on the drain gate, and lack of a gate well
- g) The inaccessibility of the top of the drain gate stem
- h) Potential inoperability of the drain gate

SECTION 4 - OPERATION AND MAINTENANCE PROCEDURES

4.1 PROCEDURES

No written operation and maintenance procedures exist for the project. The normal operation of the project consists of allowing water to flow through the service spillway outlet pipe.

4.2 MAINTENANCE OF DAM

Maintenance of the dam is performed when the need arises. Maintenance is not considered adequate as evidenced by drainage gullies, animal burrows, channel erosion, etc.

4.3 WARNING SYSTEM IN EFFECT

No warning system is in effect or in preparation.

4.4 EVALUATION

The overall condition of the dam and appurtenant structures appears to be good. Recommendations in connection with regular maintenance are discussed in Section 7.

SECTION 5 - HYDRAULIC/HYDROLOGIC

5.1 Drainage Area Characteristics

Ischua Creek Watershed Dam No. 2 is located on Johnson Creek, a tributary of Ischua Creek in the Allegheny River basin, and has a drainage area of 2.8 square miles. The dam is situated approximately 4.0 miles northeast of Franklinville, New York, and 4.0 miles southeast of Machias, New York. The topography of the watershed is gentle rolling hills.

5.2 Design Data

This dam was designed as a Class C structure in accordance with criteria established in Washington Engineering Memorandum SCS-27. Under this classification, the emergency spillway is designed for a rainfall equal to $P(100) + 0.26 [PMP - P(100)]$, while the freeboard pool is designed for the PMP rainfall.

The Soil Conservation Service (SCS) design calculations have been reviewed. The dam was designed to contain the runoff for the 100-year flood without discharging through the emergency spillway. The peak inflow and outflow are 1565 cfs and 146 cfs, respectively. The SCS design allowed for a 50-year sediment accumulation with a storage of 25 acre-ft. The principal spillway consists of a 36 in. diameter reinforced concrete water pipe and a 3.0 ft. x 9.0 ft. reinforced concrete riser with two 9.0 ft. x 12 in. openings with a crest elevation of 1721.0 ft. (MSL). The riser has a 20 in. x 7 in. orifice with invert elevation of 1706.5 ft (MSL). The emergency spillway control cross section is 140 ft. wide, with side slopes of 3 horizontal to 1 vertical and a crest elevation of 1729.5 ft. (MSL). The dam crest elevation is 1735.2 ft (MSL).

5.3 Analysis Criteria

The analysis of the spillway capacity of the dam and the storage of the reservoir was performed using the Corps of Engineers HEC-1 Dam Safety Version computer model. The unit hydrograph was defined by the Snyder Synthetic Unit Hydrograph method, and the Modified Puls routing procedure was incorporated. The Probable Maximum Precipitation (PMP) was 22.4 in. (24 hours 200 sq. miles) from Hydrometeorological Report #33 in accordance with the Recommended Guidelines of the Corps of Engineers. The dam is 42 ft. high and impounds approximately 647 acre-ft. at the top of the dam. The dam is classified as a HIGH hazard and INTERMEDIATE in size, according to the Recommended Guidelines of the Corps of Engineers. The spillway design flood is the Probable Maximum Flood (PMF). The floods selected for analysis were 20, 40, 50, 60, 80, and 100% of the PMF flows. The PMF inflow of 6457 cfs was routed through the reservoir and the peak outflow was determined to be 6391 cfs. The peak PMF outflow would produce an eroding velocity of 9.8 ft./sec. on the emergency spillway.

5.4 Reservoir Capacity

The reservoir capacities at the crest of the emergency spillway and at the top of the dam are 440 acre-ft. and 647 acre-ft., respectively. Surcharge storage between the emergency spillway crest and the top of dam is equivalent to 1.4 in. of runoff from the drainage area.

5.5 Experience Data

There are no flood records for the dam site. However, during the field investigation, evidence of recent high water was observed at elevation 1720.0 ft. (MSL). This reservoir elevation corresponds to a peak outflow of 88 cfs.

5.6 Overtopping Potential

The maximum capacity of the spillway is 6591 cfs which is greater than the PMF peak outflow of 6391 cfs. The dam is not overtopped by the PMF, the peak elevation being 0.1 ft. below the top of the dam.

5.7 Analysis of Downstream Impacts

During the field investigation, dwellings and highways located downstream of the dam were identified and referenced to the channel invert. The cross section locations used in the downstream channel routing are shown on Page D-2, Appendix D. The impacts of the PMF on dwellings located downstream of the dam are shown in Table 5.1. For the purposes of this analysis, a danger of loss of life was assumed to exist if the computed PMF water surface was above the first floor elevation of a structure. This situation occurs at six structures (Locations 1 and 3) in addition to the road crossing being overtopped at location 3.

5.8 Evaluation

The spillway of Ischua Creek Watershed Dam No. 2 will safely pass the PMF without overtopping. The spillway is, therefore, assessed as "Adequate". Potential problems include:

- a) Erosion of the emergency spillway for the test flood conditions. Because of the low probability of occurrence of the PMF, and because there is no cost effective means of preventing the erosion, no preventative recommendations are deemed necessary.
- b) The danger of loss of life and economic damage downstream of the dam for the test flood conditions.

TABLE 5.1
SUMMARY OF DOWNSTREAM IMPACTS FOR PMF

<u>Location #</u> (see page D-2, Appendix D)	<u>Location</u>	<u># of Dwellings</u>	<u>Structure Height above Streambed*</u> (ft)	<u>Peak Flow (cfs)</u>	<u>Peak Stage (ft)</u>	<u>Comments</u>
1	1800' d/s of the dam	1	7.5	6382	8	Danger of loss of life
2	2100' d/s of Location #1	0	-	6367		
3	5500' d/s of Location #2	4 1	8 7	6354 6354	10 10	Danger of loss of life, road crossing over- topped

*The structure height above the streambed is the difference in the first floor elevation and the channel invert.

SECTION 6 - STRUCTURAL STABILITY

6.1 Visual Observations

There does not appear to be significant displacement or distress associated with the embankments at this site. A small bulge in the upper left portion of the downstream slope should be investigated and repaired.

6.2 Design and Construction Data

Analyses carried out during the design and construction phase included a slope stability analysis under full drawdown conditions by a modified Swedish circle method. The soil parameters assumed were:

Upstream slope: full drawdown, 8 ft. berms @ 1720 ft. and 1717 ft., $\phi = 18.5^\circ$, $c = 325$ psf, 3H:1V slope

Downstream slope: trench drain, no berms, $\phi = 18.5$, $c = 325$ psf

The factors of safety calculated were 1.56 for the upstream slope and 1.61 for the downstream slope. They are considered adequate according to the Recommended Guidelines for Phase I Inspections.

6.3 Post Construction Changes

There have been no known changes to any of the embankments or structures at this dam.

6.4 Seismic Stability

The dam is located in Seismic Zone No. 2 and, in accordance with the recommended Phase I guidelines, a seismic stability analysis is not warranted.

SECTION 7 - ASSESSMENT/RECOMMENDATIONS

7.1 ASSESSMENT

a. Safety

Examination of the available documents and visual inspections of the Ischua Creek Watershed Dam No. 2 and appurtenant structures did not reveal any conditions which constitute a hazard to human life or property. The dam and its appurtenances are considered to be in good condition at the present time.

Using the Corps of Engineers screening criteria for review of spillway adequacy, it has been determined that the dam would not be overtopped for the spillway design flood of the full PMF. The principal and auxiliary spillway capacities are, therefore, judged as adequate.

b. Adequacy of Information

This report and its conclusions are based on visual inspection, interview data, contract drawings, and office hydrologic/hydraulic studies. This information and data are adequate for a Phase I inspection.

c. Need for Additional Investigations

It is recommended that the services of a qualified registered professional engineer be retained to evaluate:

- a. the drainage gullies across the emergency spillway and those emanating from the downstream east toe of the embankment and make recommendations for remedial measures.
- b. the bulge or slough in the upper portion of the downstream east slope and make recommendations for remedial measures.

7.2 RECOMMENDED MEASURES

- a. The results of the aforementioned investigations will determine the appropriate remedial actions required.
- b. Construct a gate well for the drain gate, extend the gate stem to the top of the riser structure and install rungs on the riser structure to provide access.

- c. Debris and vegetation should be cleared from the trash racks, downstream channel, outlet basin, auxiliary spillway channel and embankment surfaces periodically. A program of periodic mowing and cutting of the embankment and outlet channels should be provided.
- d. Provide a program of periodic inspection and maintenance of the dam and appurtenances, including yearly operation and lubrication of the gate systems. Document this information for future reference.
- e. Develop a formal written downstream warning system to alert the appropriate officials and residents in the event of an emergency.

APPENDIX A

VISUAL INSPECTION CHECKLIST

30

VISUAL INSPECTION CHECKLIST

1) Basic Data

a. General

Name of Dam Ischua Creek Watershed Dam No. 2
Fed. I.D. # NY 00560 DEC Dam No. 25C2977
River Basin Allegheny
Location: Town Farmersville County Cattaraugus
Stream Name Johnson Creek
Tributary of Ischua Creek
Latitude (N) 42° 23.5' Longitude (W) 78° 25.3'
Type of Dam Earth Embankment
Hazard Category High
Date(s) of Inspection April 2, 1981
Weather Conditions Sunny, 50°, windy
Reservoir Level at Time of Inspection Approximately 1707.2

b. Inspection Personnel Mr. Bob Farrell, Mr. Ken Avery, Mr. James Reynolds,
Mr. Jeff Hardin

c. Persons Contacted (including Address & Phone No.)
U.S. Soil Conservation Service, Rm 771-Federal Bldg., 100 So. Clinton S., Syracuse, NY
State Construction Engr. Philip "Skip" Nelson 1-315-423-5502
Area 1 Proj Engr. Pete Wright 1-716-343-3664 (Batavia)
Contracting Office (Ischua Creek Watershed) Ed Smith-contacted thru Pete Wright

d. History:
Date Constructed 1961 Date(s) Reconstructed _____
Designer USDA Soil Conservation Service
Constructed by Ischua Creek Small Watershed District with S.C.S.
Owner Ischua Creek County Small Watershed Protection District

2) Embankment

a. **Characteristics**

(1) **Embankment Material** Silty sand and gravel core, sand and gravel shells, according to plans

(2) **Cutoff Type** 14 feet wide trench cut into glacial till

(3) **Impervious Core** According to plans, it is semi-pervious silty sand and gravel

(4) **Internal Drainage System** Trench drain 4 feet wide, 80 feet downstream of centerline, gravel, some sand

(5) **Miscellaneous** Founded on glacial till

b. **Crest**

(1) **Vertical Alignment** Good

(2) **Horizontal Alignment** Good

(3) **Surface Cracks** None noted

(4) **Miscellaneous** _____

c. **Upstream Slope**

(1) **Slope (Estimate) (V:H)** 3 vertical to 1 horizontal

(2) **Undesirable Growth or Debris, Animal Burrows** Grass growth is heavy, debris on slope to about midheight

(3) **Sloughing, Subsidence or Depressions** None noted

- (4) Slope Protection 10 foot wide berm at approximately waterlevel. 3 to 6 inches to wave erosion at waterline. Another berm is located at the elevation of the high stage inlet
- (5) Surface Cracks or Movement at Toe None noted

d. **Downstream Slope**

- (1) Slope (Estimate - V:H) 2.5 horizontal to 1 vertical
- (2) Undesirable Growth or Debris, Animal Burrows Animal burrows approximately 100 feet and 250 feet left of right abutment at toe. Approximately 30 to 70 feet left of outlet structure and 5 more animal burrows. All are 6"-8" diameter
- (3) Sloughing, Subsidence, or Depressions Approximately 100 feet left of outlet and 20 feet below crest is a 6 foot diameter slough which may be result of two animal burrows just above
- (4) Surface Cracks or Movement at Toe None noted
- (5) Seepage None noted
- (6) External Drainage System (Ditches, Trenches, Blanket) Cobble drain along downstream toe, somewhat overgrown, generally good condition, no apparent flow
- (7) Condition Around Outlet Structure Some erosion to the left side emanating from 4 animal burrows approximately 40 feet left of outlet.
- (8) Seepage Beyond Toe Ground downstream to the left of the outlet structure is soggy but it is believed to be the result of natural groundwater

e. **Abutments - Embankment Contact**

Generally good condition

- (1) Erosion at Contact None noted
- (2) Seepage Along Contact None noted

Drainage System

(a) **Description of System** Vertical trench drain 80' downstream of the centerline
draining to a rockfill drain at the downstream toe of the dam

(b) **Condition of System** System could not be observed. The condition of the dam
indicates that the system is functional

(c) **Discharge from Drainage System** None apparent

) **Instrumentation (Monumentation/Surveys, Observation Wells, Weirs, Piezometers,
etc.)** None installed

Reservoir

a. **Slopes** Appear stable and in good condition. Shallow sloping woodland

b. **Sedimentation** Not measured

c. **Unusual Conditions Which Affect Dam** None apparent

Area Downstream of Dam

a. **Downstream Hazard (No. of homes, highways, etc)** See Table 5-1

b. **Seepage, unusual growth** No seepage noted

c. **Evidence of movement beyond toe of Dam** None noted

d. **Conditions of Downstream Channel** Stable, narrow channel over rolling terrain

7) Spillway(s) (Including Discharge Conveyance Channel)

Generally good condition with the exception of erosion gullies at upstream end and animal burrows in diversion dikes

- a. General Drainage gullies up to 3 ft. deep emanating from natural ground and crossing the upstream channel of the emergency spillway. Three (3) animal burrows in left dike.
- b. Condition of Service Spillway Good; no evidence of spalling, cracking or efflorescence
- c. Condition of Auxiliary Spillway Generally good; erosion gullies should be repaired and possibly a drainage path provided for the natural groundwater flow.
- d. Condition of Discharge Conveyance Channel Generally good at the present time.

3) Reservoir Drain/Outlet

Type: Pipe Conduit _____ Other _____

Material: Concrete _____ Metal Other _____

Size: 8" Length 40'

Invert Elevations: Entrance _____ Exit _____

Physical Condition (Describe): _____ Unobservable

Material: _____

Joints: _____ Alignment _____

Structural Integrity: _____

Hydraulic Capability: _____

Means of Control: Gate _____ Valve Uncontrolled _____

Operation: Operable _____ Inoperable _____ Other _____

Present Condition (Describe): No handle. Gate valve stem does not appear to extend to top of riser.

9) Structural

- a. Concrete Surfaces _____ N/A

- b. Structural Cracking _____ N/A

- c. Movement - Horizontal & Vertical Alignment (Settlement) _____ N/A

- d. Junctions with Abutments or Embankments _____ N/A

- e. Drains - Foundation, Joint, Face _____ N/A

- f. Water Passages, Conduits, Sluices _____ N/A

- g. Seepage or Leakage _____ N/A

- h. Joints - Construction, etc. _____ N/A

- i. Foundation _____ N/A

- j. Abutments _____ N/A

- k. Control Gates _____ N/A

- l. Approach & Outlet Channels _____ N/A

m. Energy Dissipators (Plunge Pool, etc) N/A

n. Intake Structures N/A

o. Stability N/A

p. Miscellaneous N/A

0) Appurtenant Structures (Power House, Lock, Gatchouse, Other)

a. Description and Condition None

APPENDIX B
ENGINEERING DATA

APPENDIX B

<u>TITLE</u>	<u>PAGE</u>
Cover Sheet	B-2
Plan of Storage Areas	B-3
Site Plan	B-4
Profiles	B-5
Seepage Drain Details	B-6
Plan - Profile of Principal Spillway	B-7
Riser Details	B-8
Cradle Collars & Bent Details	B-9
Gate Well, Trash Racks & Misc. Details	B-10

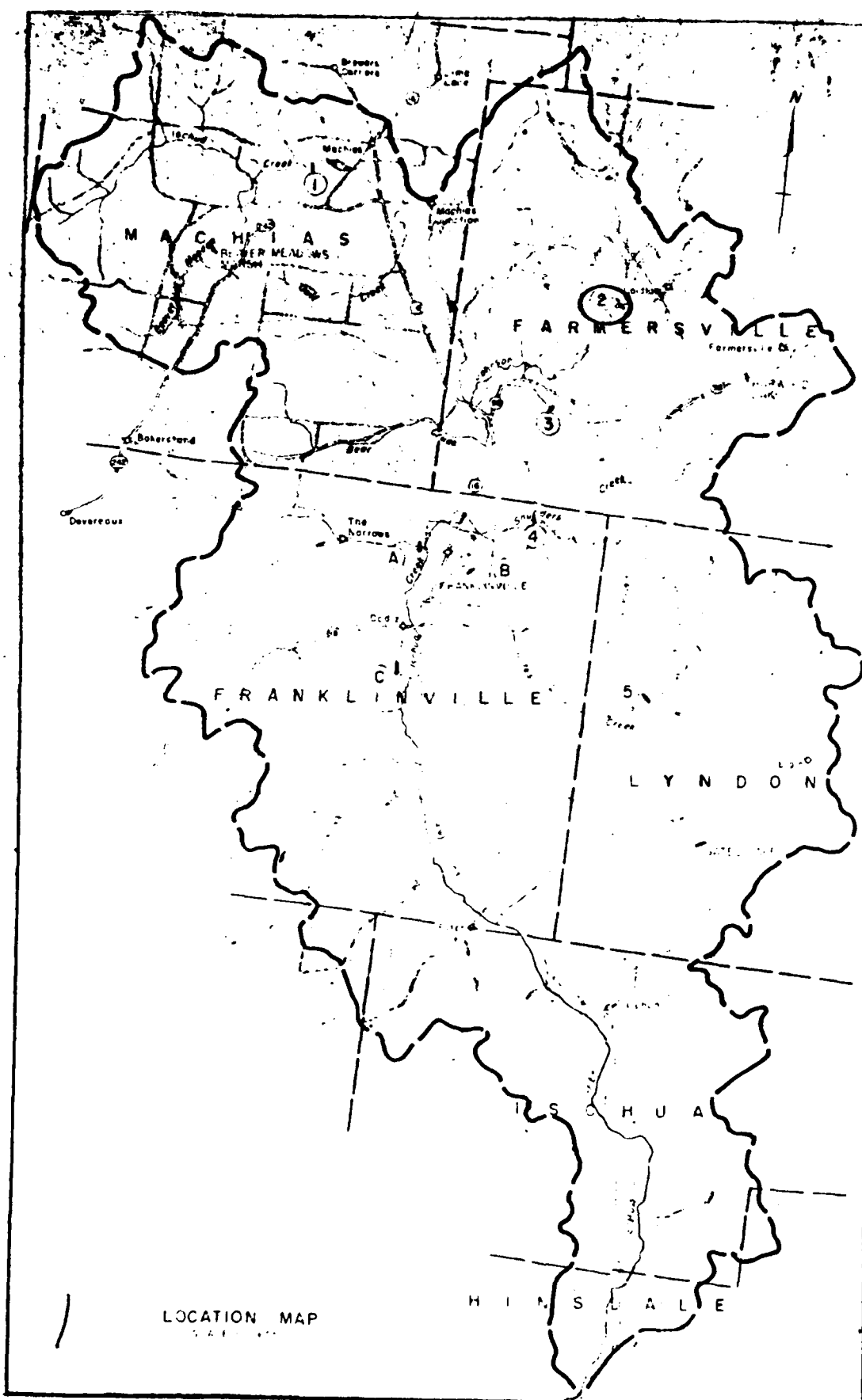
ISCHUA FLO

DRAINAGE
TOTAL S
WATER S
HEIGHT C
VOLUME

BUILT U

ISC

- SHEET 1 COVER SHEET
- SHEET 2 PLAN OF SITE
- SHEET 3 DAMSITE
- SHEET 4 PROFILES
- SHEET 5 SEEPAGE DR
- SHEET 6 PLAN - PROF
- SHEET 7 RISER DETAIL
- SHEET 8 CRADLE, CO
- SHEET 9 GATE WELL



LOCATION MAP

1911 12 2 17-2

ISCHUA CREEK WATERSHED PROJECT

FLOODWATER RETARDING DAM NO. 2

DRAINAGE AREA	1792	Acres
TOTAL STORAGE	465	Acres ft.
WATER SURFACE AREA	6.5	Acres
HEIGHT OF DAM	38	Feet
VOLUME OF FILL	138749	Cubic Yards

BUILT UNDER THE WATERSHED PROTECTION AND
FLOOD PREVENTION ACT

by

ISCHUA CREEK SMALL WATERSHED DISTRICT

with the assistance of

SOIL CONSERVATION SERVICE

of the

U S DEPARTMENT OF AGRICULTURE

- SHEET 1 COVER SHEET
- SHEET 2 PLAN OF STORAGE AREAS
- SHEET 3 DAMSITE
- SHEET 4 PROFILES
- SHEET 5 SEEPAGE DRAIN DETAILS
- SHEET 6 PLAN - PROFILE OF PRINCIPAL SPILLWAY
- SHEET 7 RISER DETAILS
- SHEET 8 CRADLE, COLLARS & BENT DETAILS
- SHEET 9 GATE WELL, TRASH RACKS & MISC DETAILS

AS BUILT

ISCHUA CREEK WATERSHED PROJECT FLOODWATER RETARDING DAM NO. 2 JOHNSON CREEK LAUREL, NEW YORK COVER SHEET	
U S DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	
PL. WALL	Mo. 51
CONCRETE	Apr. 51
U. S. M. S.	Apr. 51
	802



SCALE 1" = 400'

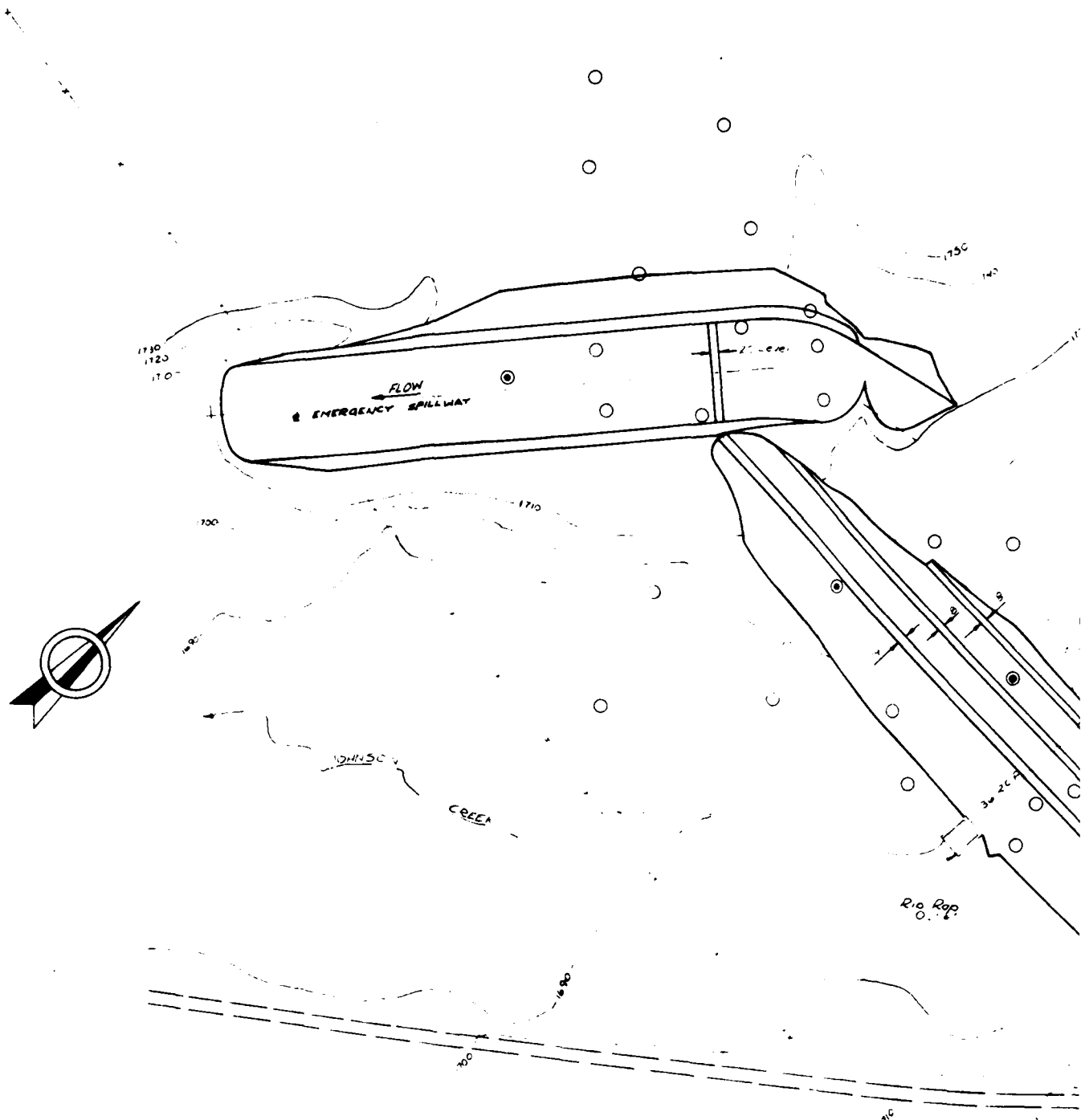
AS BUILT

2

As built Plans

SCALE 1" = 200'		CENTRAL INTERVAL 5'	
TOP OF DAM	ELEV. 1752		
SEDIMENT POOL	ELEV. 1745		
CREST OF DAM	ELEV. 1728		
CREST OF DAM AT SPILL	ELEV. 1745		
SECTION HIGH WATER	1745		
ISCHUA CREEK WATERSHED FLOODWATER RETARDING DAM JOHNSON CREEK LAIDLAW, NEW YORK PLAN OF STORAGE AREAS			
U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE			
Designer	Date	Checked by	
J.D. TYLER	SEP '60		
J.D. TYLER	SEPT '60		
P.S.D.	NOV '60	Checked by	
N.F.S. MFS	APR '61	NO 2	NY - 8-2-F

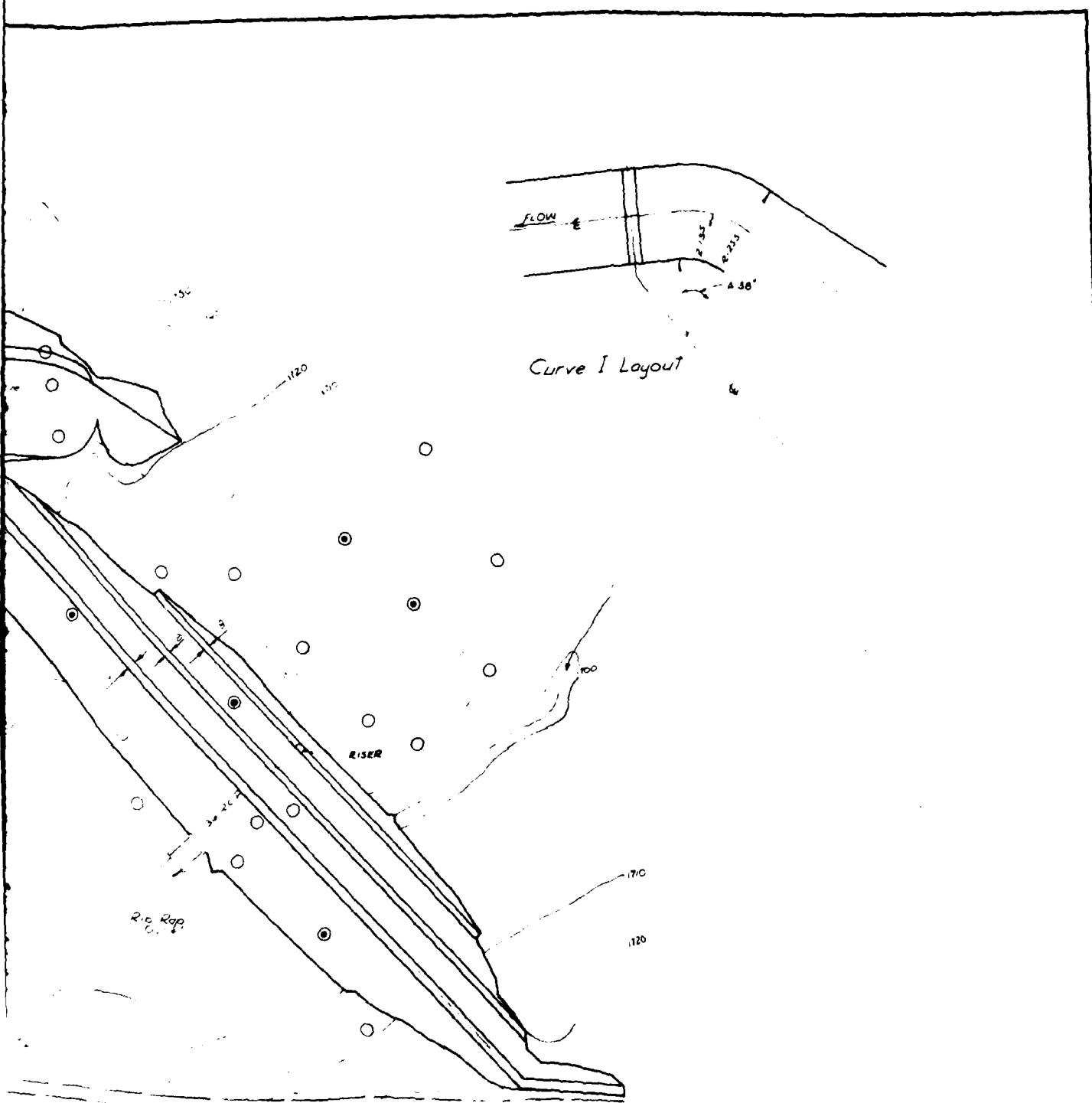
B-3



LEGEND

- - - Fence Line
- - - Stream
- Contour Line
- Road
- ⊙ Test pit or drill hole (Sampled)
- Test pit or drill hole

1

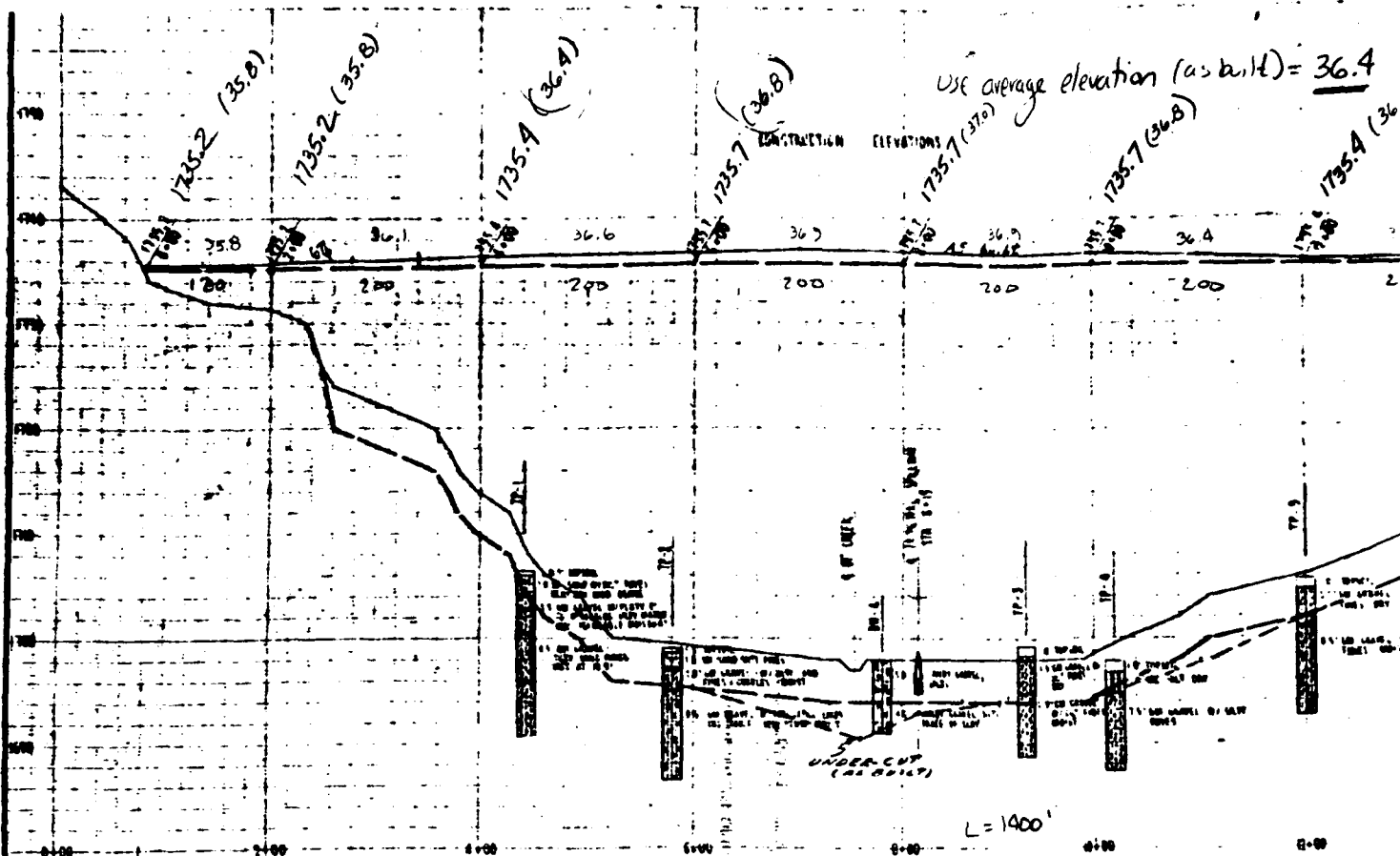


ISCHUA CREEK WATERSHED DAM #2
 NY00560

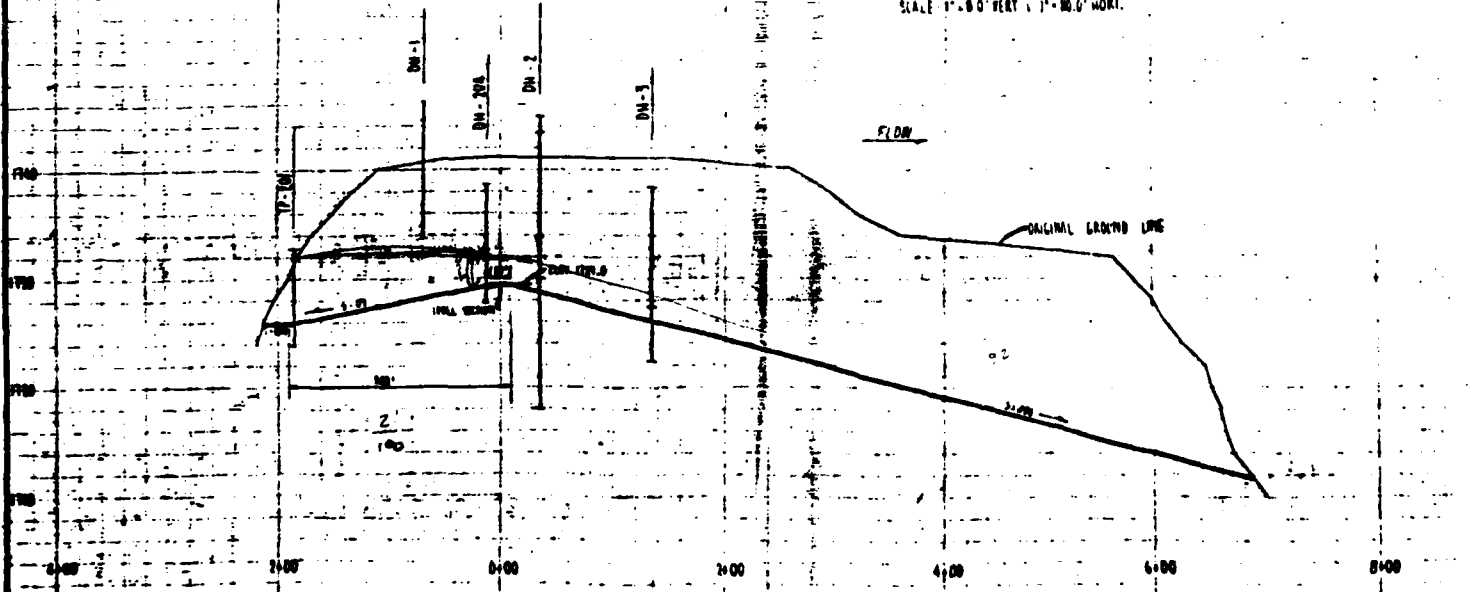
SITE PLAN

ERDMAN, ANTHONY, ASSOCIATES
 CONSULTING ENGINEERS & PLANNERS

DATE
 MAY 1981

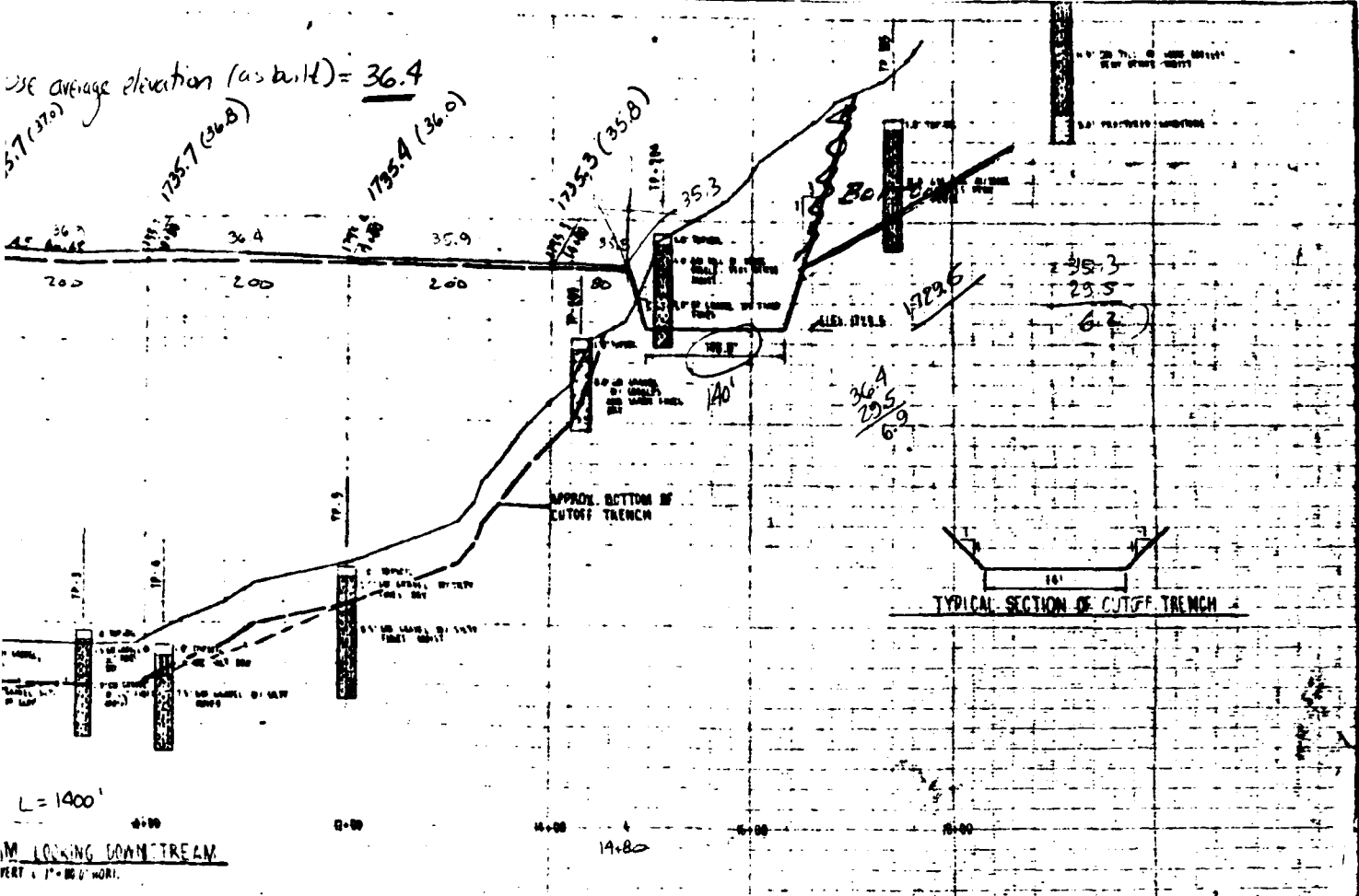


PROFILE ALONG 3 DAM LOOKING DOWNSTREAM
 SCALE 1" = 80' VERT 1" = 80.0' HORIZ.

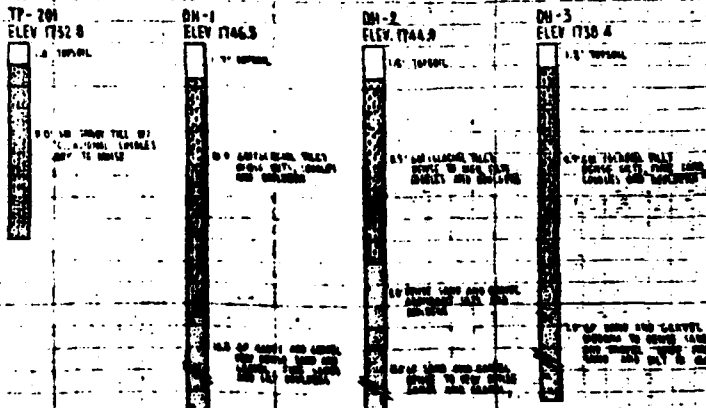


PROFILE ALONG 4 EMERGENCY SPILLWAY
 SCALE 1" = 80' VERT 1" = 80.0' HORIZ.

USE average elevation (as built) = 36.4
 5.7 (37.0) 1735.7 (36.8) 1735.4 (36.9)



SOILS DATA



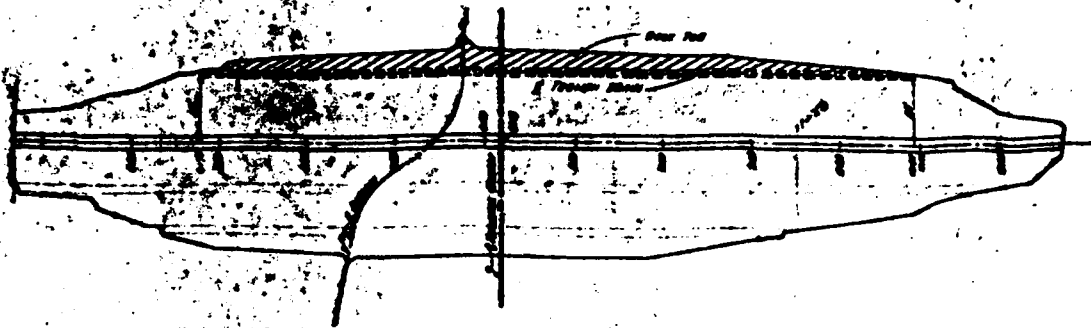
AS BUILT

DATE OF GEOLOGIC INVESTIGATION, SEPT. 1950
 UNIFIED SOIL CLASSIFICATION BY VISUAL DESCRIPTION

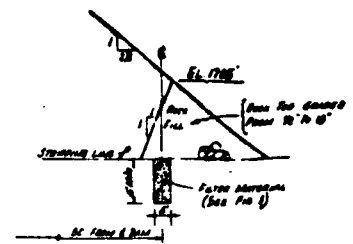
ISCHUA CREEK WATERSHED PROJECT FLOODWATER RETARDING DAM NO. 2 JOHNSON CREEK LAIDLAW, NEW YORK PROFILES			
U. S. DEPARTMENT OF AGRICULTURE - SOIL CONSERVATION SERVICE			
Prepared by J. B. TYLER R. H. WOODMAN Checked by J. B. TYLER	Date Oct. 20, 1950 Oct. 20, 1950 Oct. 20, 1950	Checked by J. B. TYLER R. H. WOODMAN	Date Oct. 20, 1950 Oct. 20, 1950
Drawing No.			NY-602-P

2
 To bulk plans

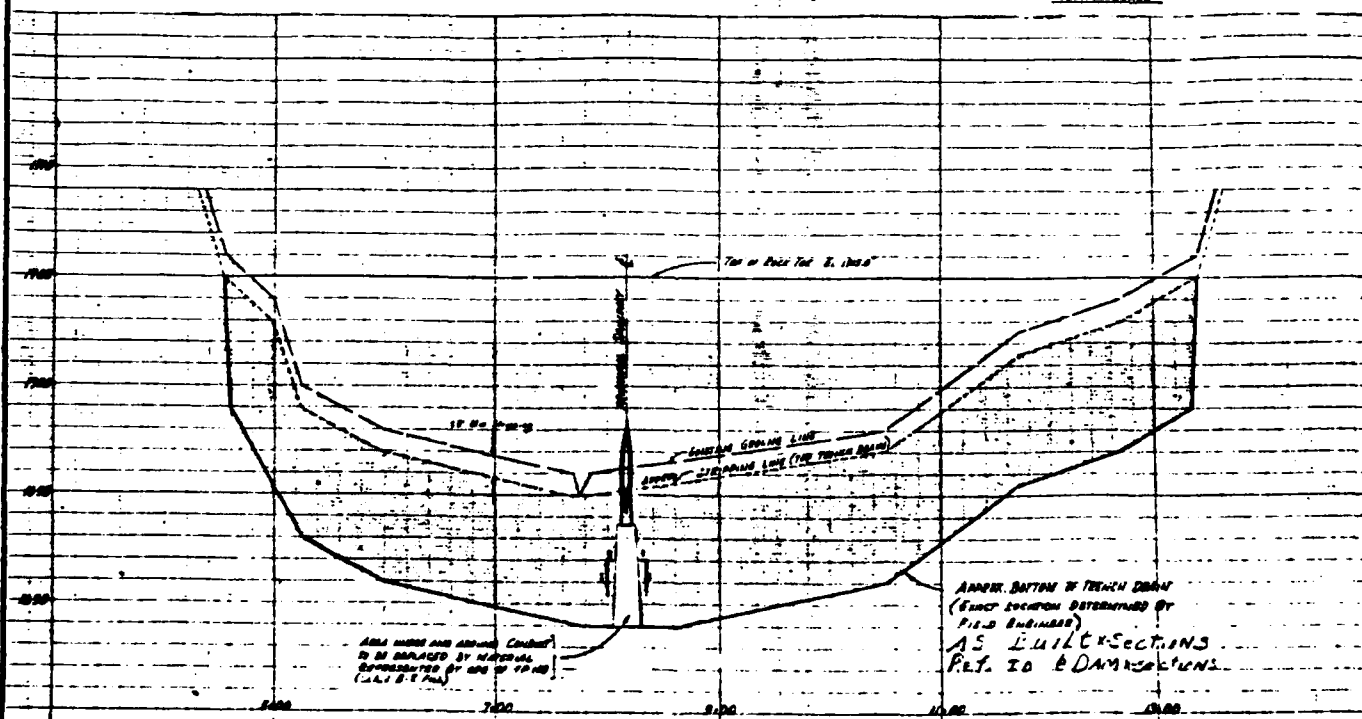
NOTE: SECTION NO. 1
 FIELD LOCATION &
 THE SUITABILITY &
 DISPOSITION OF THIS
 BE SUBJECT TO A
 (SEC. 8, P.C. 8.5)



PLAN VIEW
 SCALE 1:100



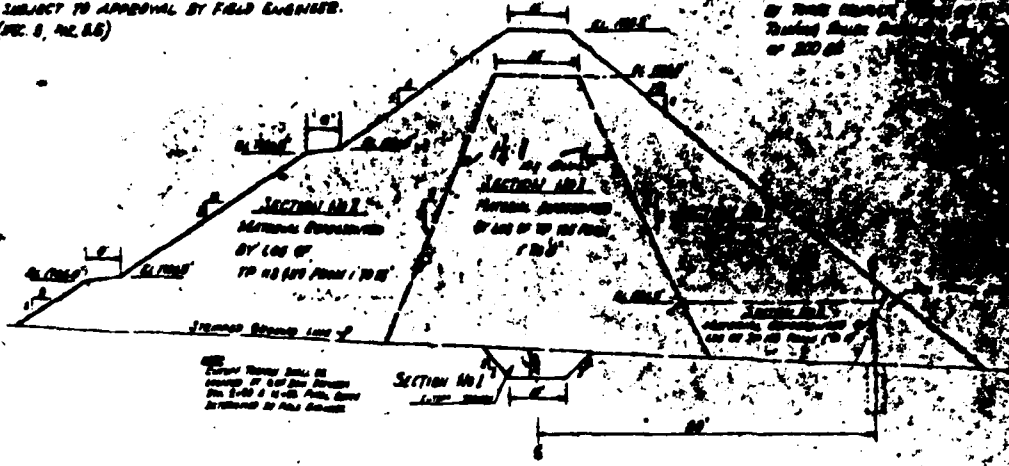
TYPICAL SECTION OF ROCK TOE & TRENCH DRAIN
 NOT TO SCALE



PROFILE ALONG TRENCH DRAIN
 SCALE - HORIZ. 1"=20' VERT. 1"=4'
 (INCLUDING DRAINAGE CHANNEL)

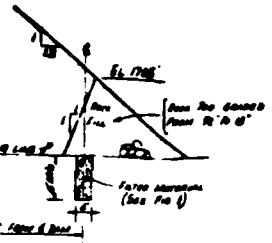
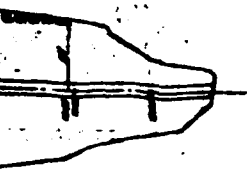
ALL SECTION NO. 1 LIFT LINES ARE APPROX.
 THEIR LOCATION DETERMINED BY FIELD SURV.
 THE SUITABILITY OF MATERIALS AND THEIR
 DISPOSITION IN THE FILL SHALL AT ALL TIMES
 BE SUBJECT TO APPROVAL BY FIELD ENGINEER.
 (SEC. 8, REC. 86)

CONSTRUCTION OF SEEPAGE DRAIN
 SECTION NO. 1
 AS BUILT

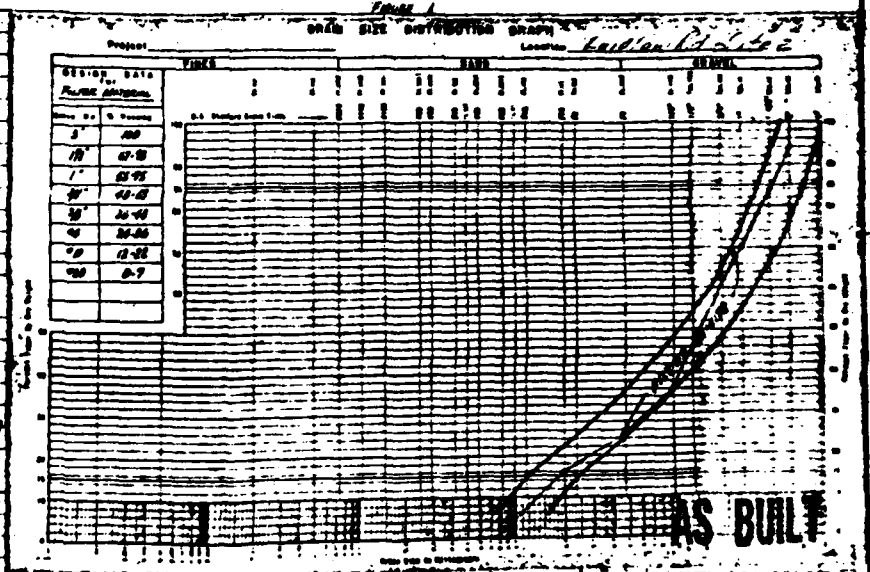


TYPICAL SECTION OF FILL
 NOT TO SCALE

AS BUILT



SECTION OF ROCK TOE & TRENCH DRAIN
 NOT TO SCALE



AS BUILT

SECTION OF TRENCH DRAIN
 LOCATION DETERMINED BY
 SURVEYING
 ELEVATIONS
 TO DAM SECTIONS

2

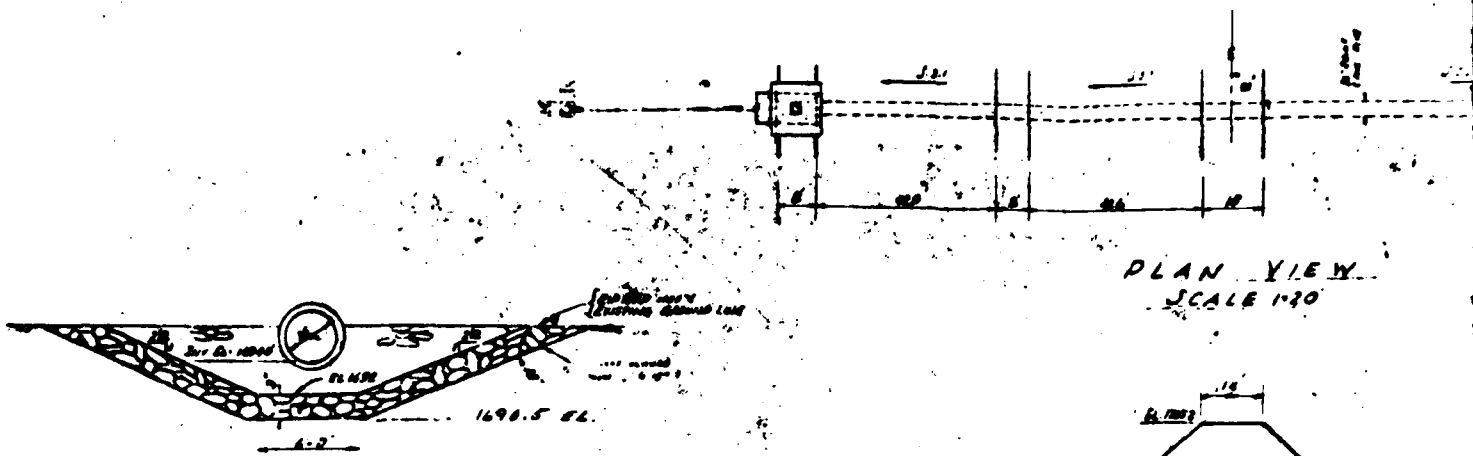
As built plans

ISCHUA CREEK WATERSHED PROJECT
 FLOODWATER RETARDING DAM NO 2
 JOHNSON CREEK
 LAIDLAW, NEW YORK
 SEEPAGE DRAIN DETAILS

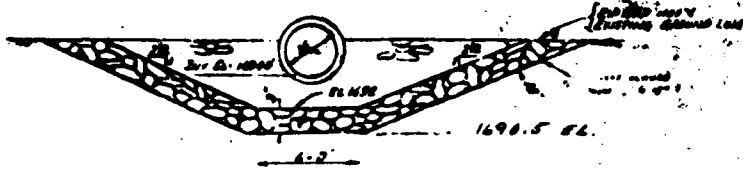
U.S. DEPARTMENT OF AGRICULTURE
 SOIL CONSERVATION SERVICE

Designed by N F STILES	Date Mar '51	Approved by [Signature]
Checked by G CELIAS	Date Apr '51	Approved by [Signature]
Drawn by S ROSSLER	Date Apr '51	Approved by [Signature]

NY - 802 - P

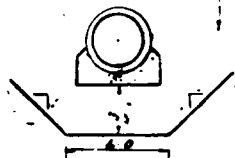


PLAN VIEW
SCALE 1/20



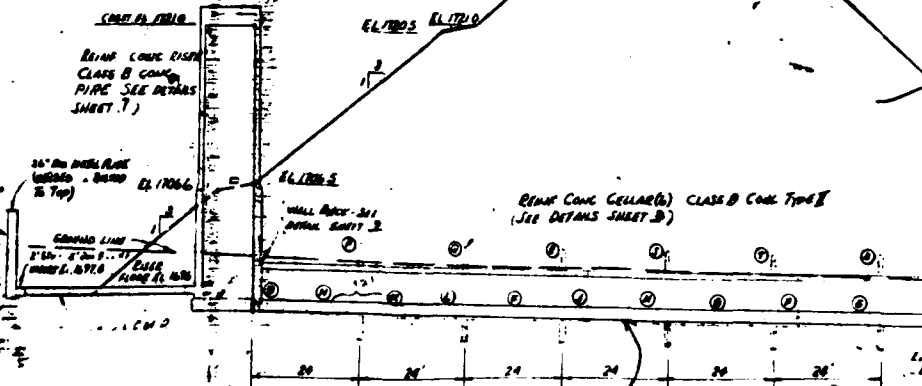
SECTION A-A
SCALE 1/4" = 1'-0"

NOTE
BACKFILL UNDER AND AROUND
CONDUIT WITH CLAY REPRESENTED
BY TP-105 (CLASS B - PHL)



TYPICAL SECTION
PRINCIPAL SPILLWAY EXCAVATION

EL. 1705.5 TO 1706.5
18" DIA. CONCRETE PIPE
CLASS B CONC. PIPE SEE DETAILS
SHEET 7)



PROFILE ALONG & PRINCIPAL
SCALE - HORIZ. 1/20
VERT. 1/8

SOILS DATA

TP 300
EL. 1706.5
15' 0" silty sand
15' 0" silty sand
15' 0" silty sand
15' 0" silty sand
15' 0" silty sand
15' 0" silty sand

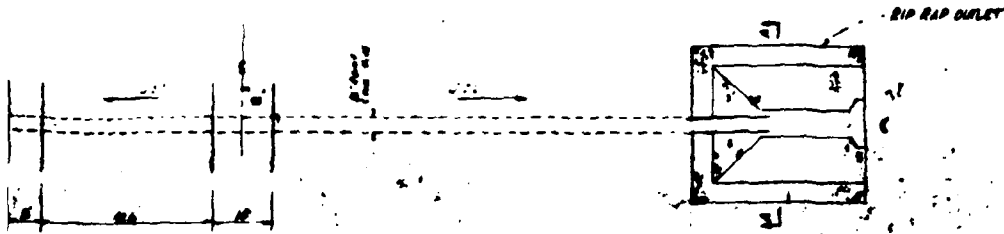
TP 302
EL. 1706.5
15' 0" silty sand
15' 0" silty sand
15' 0" silty sand
15' 0" silty sand
15' 0" silty sand
15' 0" silty sand

TP 303
EL. 1706.5
15' 0" silty sand
15' 0" silty sand
15' 0" silty sand
15' 0" silty sand
15' 0" silty sand
15' 0" silty sand

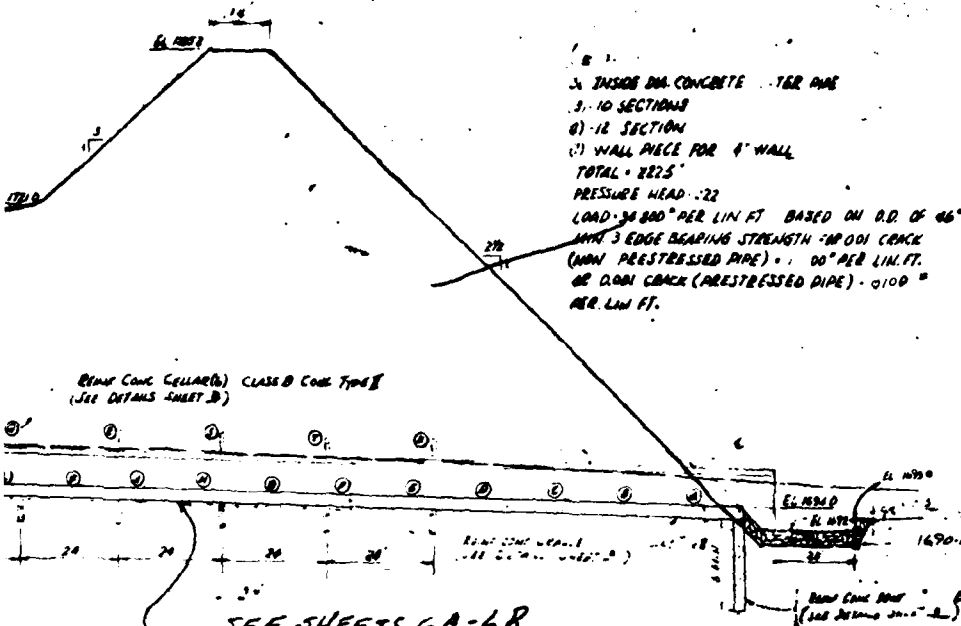
TP 304
EL. 1706.5
15' 0" silty sand
15' 0" silty sand
15' 0" silty sand
15' 0" silty sand
15' 0" silty sand
15' 0" silty sand

TP 305
EL. 1706.5
15' 0" silty sand
15' 0" silty sand
15' 0" silty sand
15' 0" silty sand
15' 0" silty sand
15' 0" silty sand

DATE OF GEOLOGICAL INVESTIGATION SEPT 1960
UNIFIED SOIL CLASSIFICATION - SI VISUAL INSPECTION



PLAN VIEW
SCALE 1"=20'



3/4 INCH DIA CONCRETE TIE BARS
 3-10 SECTIONS
 8-12 SECTION
 (1) WALL PIECE FOR 4' WALL
 TOTAL = 2225"
 PRESSURE HEAD = 22'
 LOAD = 34,800 PER LIN FT BASED ON O.D. OF 46"
 MIN 3 EDGE BEARING STRENGTH = 1000 LB CRACK
 (MIN PRESTRESSED PIPE) = 100 PER LIN FT.
 OR 1000 LB CRACK (PRESTRESSED PIPE) = 1000 PER LIN FT.

OUTLET OF 36" PIPE	INVERT OF 36" PIPE
A	1654.88
B	1676.88
C	1698.88
D	1695.88
E	1695.88
F	1695.92
G	1695.97
H	1695.83
I	1695.76
J	1695.89
K	1695.98
L	1695.93
M	1695.98
N	1695.98
O	1696.00
P	1695.97
Q	1695.88
R	1695.94
S	1695.88
T	1695.94
U	1695.88

NOTE: PIPE LENGTHS ARE NOMINAL AND DO NOT INCLUDE CURB.

SEE SHEETS 6A-6B
 Profile and X-sections
 6 ALONG E PRINCIPAL SPILLWAY
 SCALE HORIZ: 1"=20'
 VERT: 1"=8'

TYPICAL OUTLET CHANNEL SECTION

AS BUILT

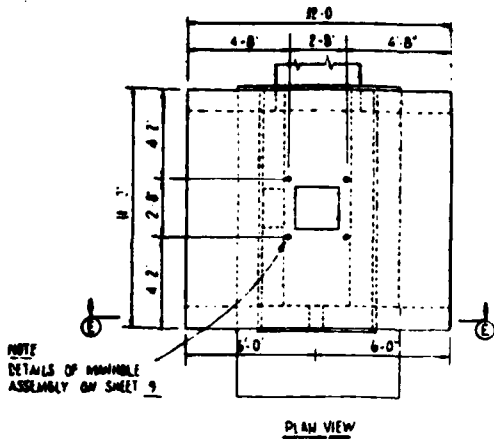
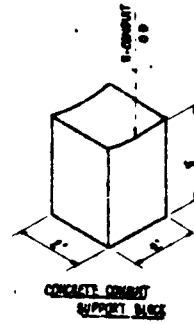
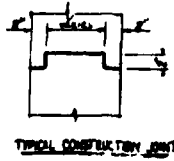
ISCHUA CREEK WATERSHED PROJECT
 FLOODWATER RETARDING DAM NO. 2
 JOHNSON CREEK
 LAIDLAW, NEW YORK
 PLAN - PROFILE OF PRINCIPAL SPILLWAY
 U.S. DEPARTMENT OF AGRICULTURE
 SOIL CONSERVATION SERVICE

DESIGNED BY H. L. WALL	DATE MAY 51
CHECKED BY G. C. ELIAS	DATE APR 51
APPROVED BY H. E. GIBBS	DATE APR 51

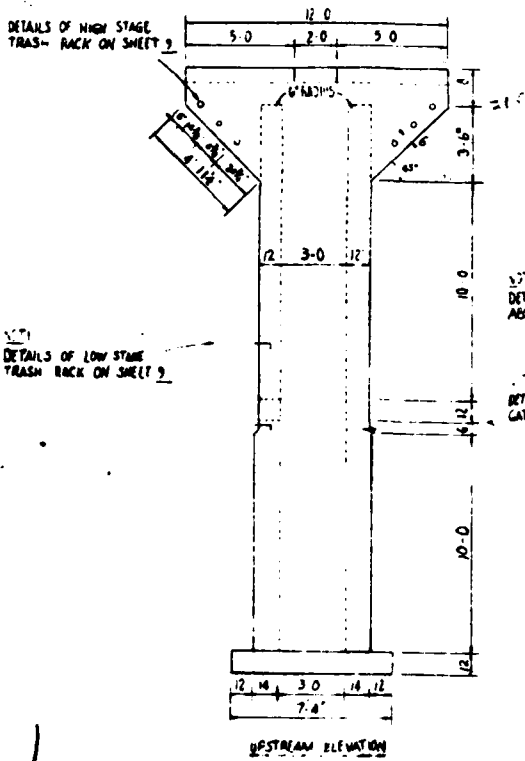
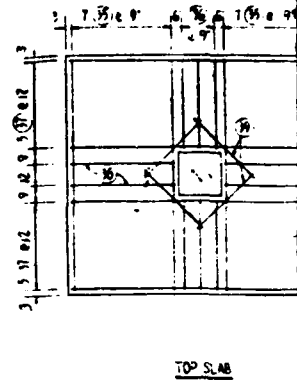
PROJECT NO. NY-602-P

2

INVESTIGATION SEPT 1960
 BY NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

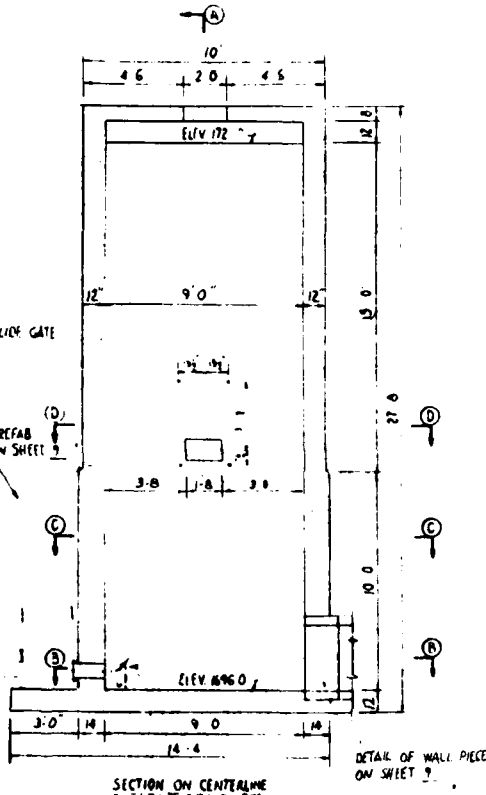


SLIDE GATE DETAILS
 8" SLIDE GATE ARMCO MODEL DIC OR APPROVED EQUAL
 REMOVABLE LIFT-HUD
 OPERATING HEAD 10 FEET
 STEM LENGTH 1 FEET
 FRAME HEIGHT MINIMUM
 BRONZE SEAT FACINGS - LIFT NUTS
 LOCATE ANCHOR BOLTS ACCORDING TO MANUFACTURERS
 RECOMMENDATIONS

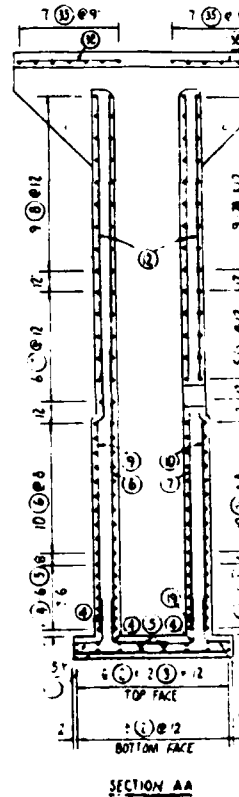


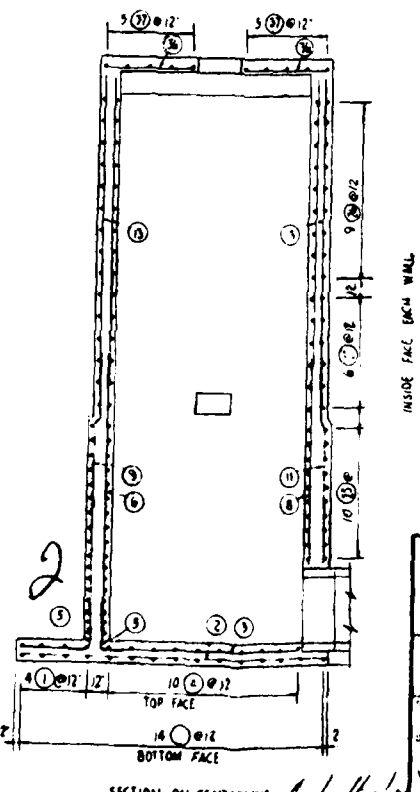
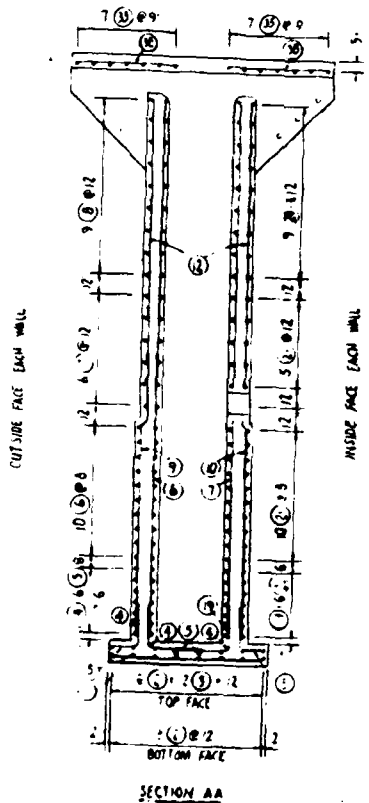
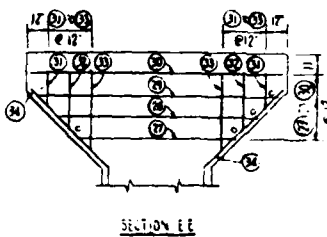
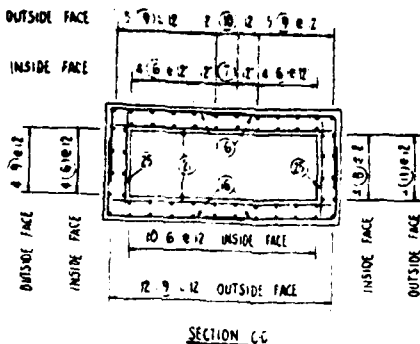
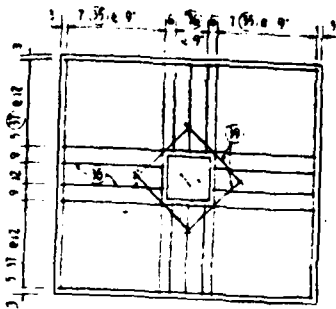
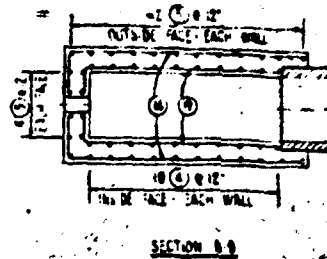
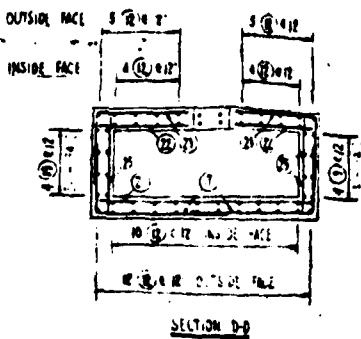
DETAILS ON SLIDE GATE ABOVE

DETAILS OF PREFAB GATE WELL ON SHEET 9



OUTSIDE FACE EACH WALL





AS BUILT

ISCHUA CREEK WATERSHED PROJECT
 FLOODWATER RETARDING DAM NO 2
 JOHNSON CREEK
 LAIDLAW, NEW YORK
 RISER DETAILS

U.S. DEPARTMENT OF AGRICULTURE
 SOIL CONSERVATION SERVICE

Project No.	Date	Approved by
Drawn by	Checked by	Title
Traced	Scale	Sheet
Drawn by	Scale	Sheet
Drawn by	Scale	Sheet

Drawing No. **NY-802**

STEEL SCHEDULE

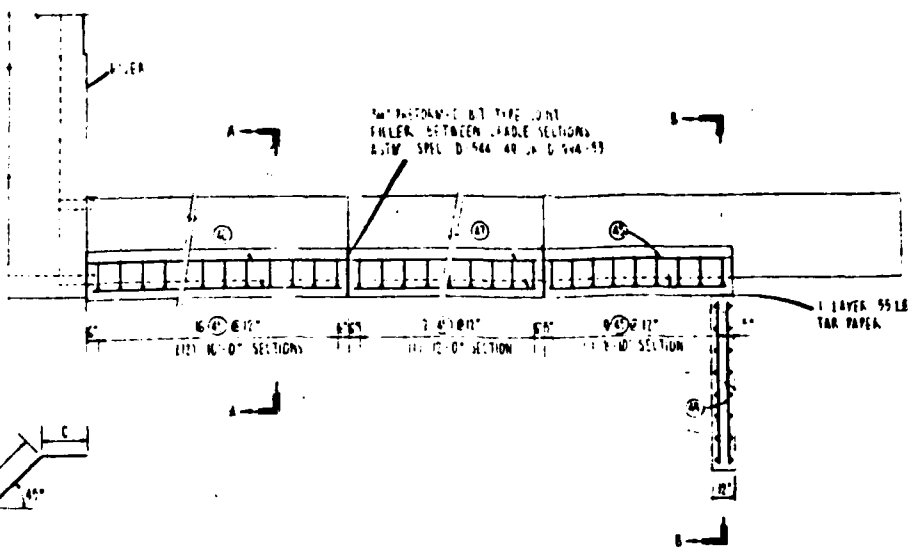
NO.	LOCATION	QTY	LEN	WT	A	B	C	TOTAL WT
1	WALL	12	8	12				144
2	WALL	12	8	12				144
3	WALL	12	8	12				144
4	WALL	12	8	12				144
5	WALL	12	8	12				144
6	WALL	12	8	12				144
7	WALL	12	8	12				144
8	WALL	12	8	12				144
9	WALL	12	8	12				144
10	WALL	12	8	12				144
11	WALL	12	8	12				144
12	WALL	12	8	12				144
13	WALL	12	8	12				144
14	WALL	12	8	12				144
15	WALL	12	8	12				144
16	WALL	12	8	12				144
17	WALL	12	8	12				144
18	WALL	12	8	12				144
19	WALL	12	8	12				144
20	WALL	12	8	12				144
21	WALL	12	8	12				144
22	WALL	12	8	12				144
23	WALL	12	8	12				144
24	WALL	12	8	12				144
25	WALL	12	8	12				144
26	WALL	12	8	12				144
27	WALL	12	8	12				144
28	WALL	12	8	12				144
29	WALL	12	8	12				144
30	WALL	12	8	12				144
31	WALL	12	8	12				144
32	WALL	12	8	12				144
33	WALL	12	8	12				144
34	WALL	12	8	12				144
35	WALL	12	8	12				144
36	WALL	12	8	12				144
37	WALL	12	8	12				144
38	WALL	12	8	12				144
39	WALL	12	8	12				144
40	WALL	12	8	12				144
41	WALL	12	8	12				144
42	WALL	12	8	12				144
43	WALL	12	8	12				144
44	WALL	12	8	12				144
45	CRADLE	12	8	12				144
46	CRADLE	12	8	12				144
47	CRADLE	12	8	12				144
48	CRADLE	12	8	12				144
49	CRADLE	12	8	12				144
50	CRADLE	12	8	12				144
51	CRADLE	12	8	12				144
52	CRADLE	12	8	12				144

STEEL

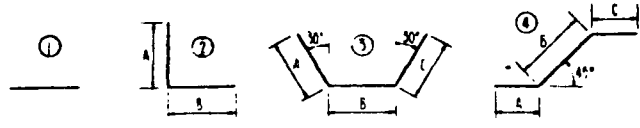
*4 BARS 1422.50 LIN FT 5096.4 LB
 *5 BARS 2567.50 LIN FT 8021.8 LB
 *6 BARS 1422.50 LIN FT 5096.4 LB
TOTAL 1262.8 LBS

CONCRETE

CLASS "B" TYPE I 36.6 CU YDS
 CLASS "B" TYPE II 66.7 CU YDS



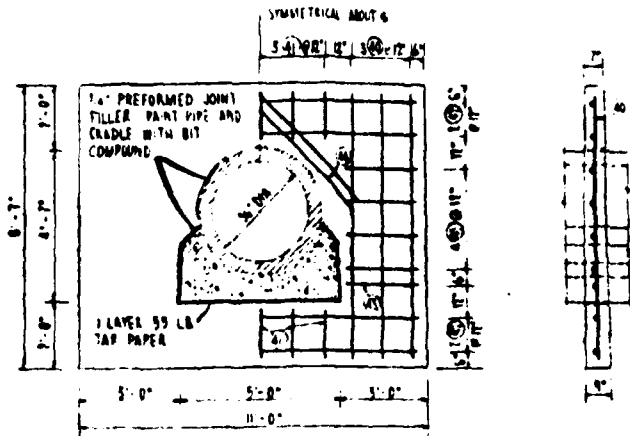
BAR TYPES



DETAIL OF REINFORCED CONCRETE CRADLE AND BENT

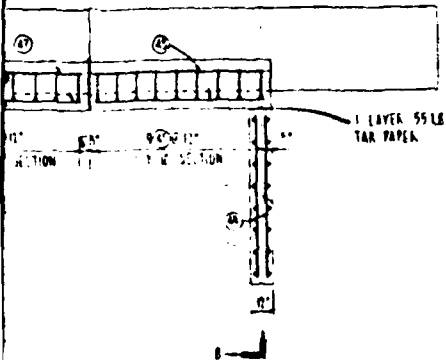
GENERAL NOTES:

1. ALL CONCRETE SHALL BE CLASS "B" AND OF THE TYPE NOTED.
2. PORTLAND CEMENT TYPE I WITH AN AIR-ENTRAINING ADMIXTURE (CLASS "A") SHALL BE USED.
3. ALL REINFORCING STEEL TO BE LAPPED 50 BAR DIAMETERS (MIN)
4. ALL REINFORCING STEEL PLACED IN CONCRETE POURED AGAINST THE FORMS SHALL HAVE A MINIMUM OF 3" CLEAR COVER. WHERE FORMS ARE USED BARS SHALL HAVE A MINIMUM OF 2" CLEAR COVER.
5. ALL EXPOSED EDGES OF CONCRETE TO HAVE A 3/8" CHAMFER UNLESS OTHERWISE NOTED.

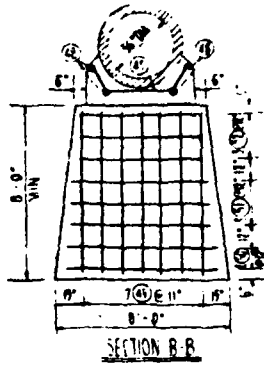


DETAIL OF REINFORCED CONCRETE ANTI-SEEP COLLAR - 6 REQ.
SCALE: 1/4" = 1'-0"

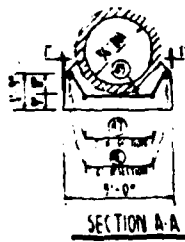
BT TYPE JOINT
CONCRETE SECTIONS
1944 AN 12 8 144 53



CONCRETE CRADLE AND BENT



SECTION B-B



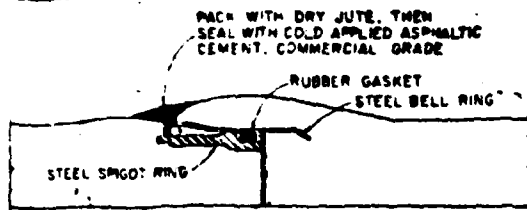
SECTION A-A

AS BUILT

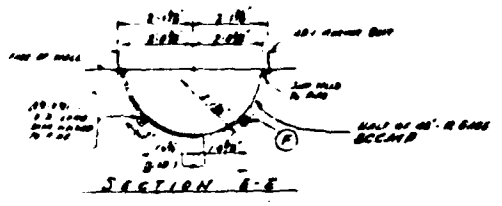
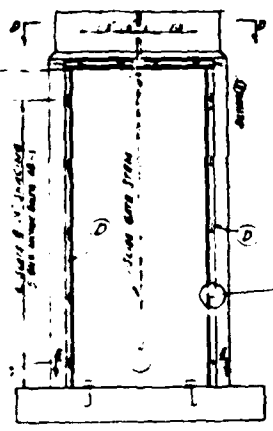
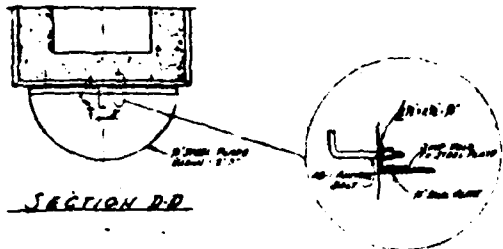
ES:
SHALL BE CLASS "B" AND OF THE TYPE
ENT TYPE 1 WITH AN AIR-ENTRAINING
ADDITIONAL SHALL BE USED
REINFORCING STEEL TO BE LAPPED 30 BAR
(14M)
REINFORCING STEEL PLACED IN CONCRETE POURED
ROUND SHALL HAVE A MINIMUM OF 3"
WHERE FORMS ARE USED BARS SHALL HAVE
1/2" CLEAR COVER
EDGES OF CONCRETE TO HAVE A 1/4"
SS OTHERWISE NOTED

2

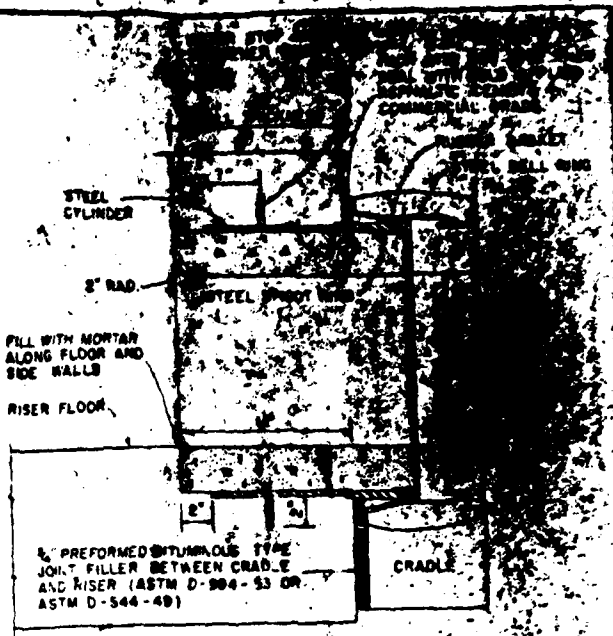
ISCHUA CREEK WATERSHED PROJECT	
FLOODWATER RETARDING DAM NO 2	
JOHNSON CREEK	
LADLAW, NEW YORK	
CRADLE COLLARS & BENT DETAILS	
U. S. DEPARTMENT OF AGRICULTURE	
SOIL CONSERVATION SERVICE	
Designed by J. L. WALL	Checked by W. H. HERRICK
Drawn by L. E. BERRY	NY - 602 - P



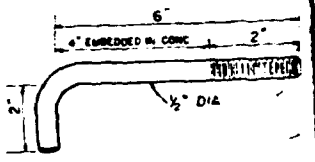
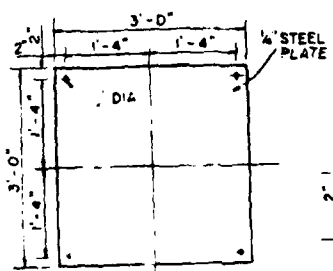
DETAIL OF REINFORCED CONCRETE WATER PIPE JOINT



DETAILS OF GATE WELL



DETAIL OF WALL PIECE IN RISER



MANHOLE ASSEMBLY

AS BUILT

BILL OF MATERIAL

LOCATION	ITEM	SIZE	LENGTH	QUANTITY
TRASH TRAP COMP. BRG.	STEEL PIPE	12" DIA	12' 0"	1
	STEEL GASKET RING	12" DIA	12' 0"	1
	STEEL BELL RING	12" DIA	12' 0"	1
	STEEL GASKET RING	12" DIA	12' 0"	1
GATE WELL	STEEL PIPE	12" DIA	12' 0"	1
	STEEL GASKET RING	12" DIA	12' 0"	1
	STEEL BELL RING	12" DIA	12' 0"	1
	STEEL GASKET RING	12" DIA	12' 0"	1
MANHOLE	STEEL PIPE	12" DIA	12' 0"	1
	STEEL GASKET RING	12" DIA	12' 0"	1
NOTE	ALL MATERIAL SHALL BE AS BUILT			

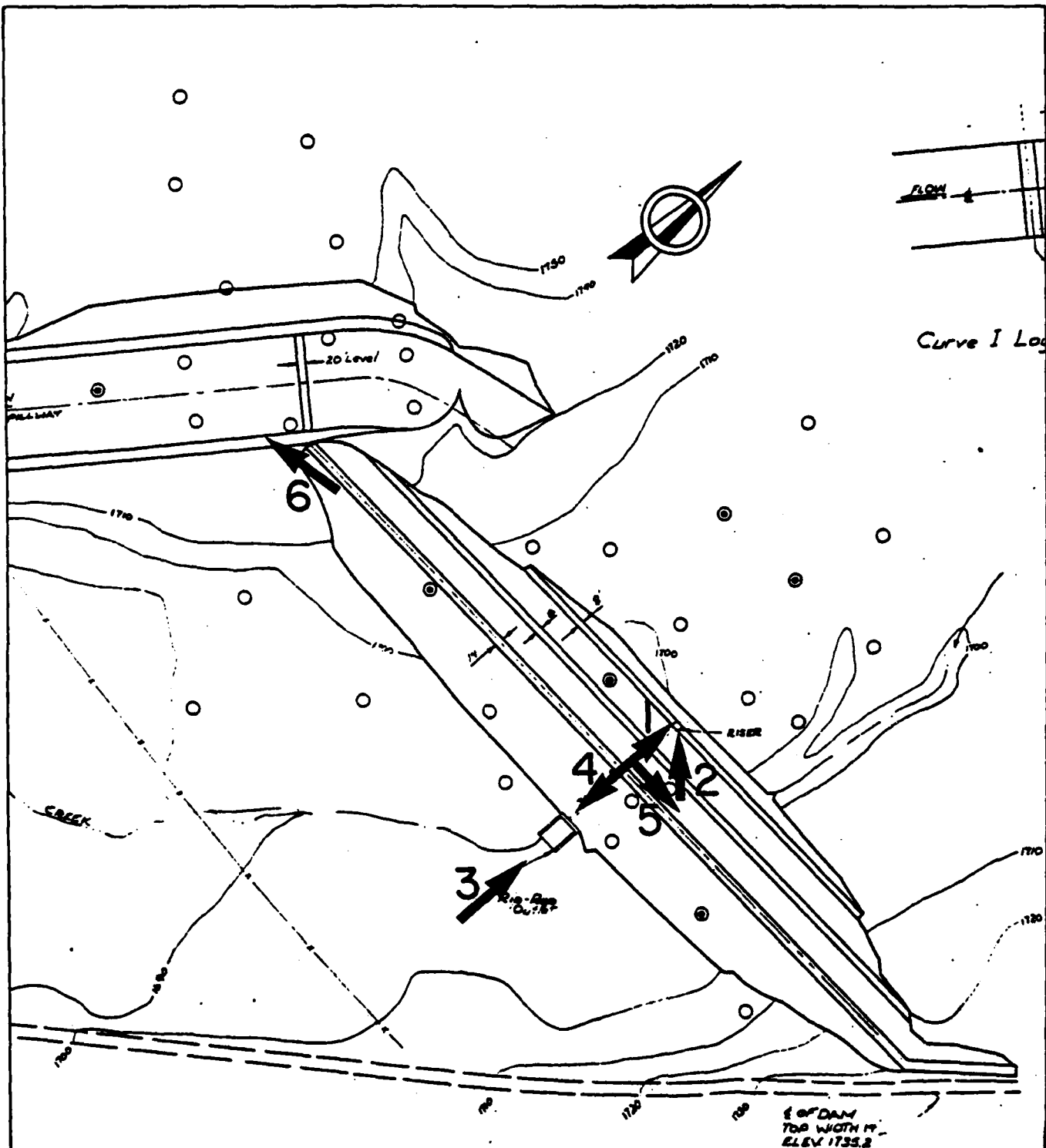
ISCHUA CREEK WATERSHED PROJECT
FLOODWATER RETARDING DAM NO 2
JOHNSON CREEK
LAIPLAW, NEW YORK
GATE WELL, TRASH RACKS & MISC DETAILS
U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

DATE: _____
 DRAWN BY: J.C. ELIAS
 CHECKED BY: _____
 APPROVED BY: _____

NY-802-P
 B-10

APPENDIX C

PHOTOGRAPHS



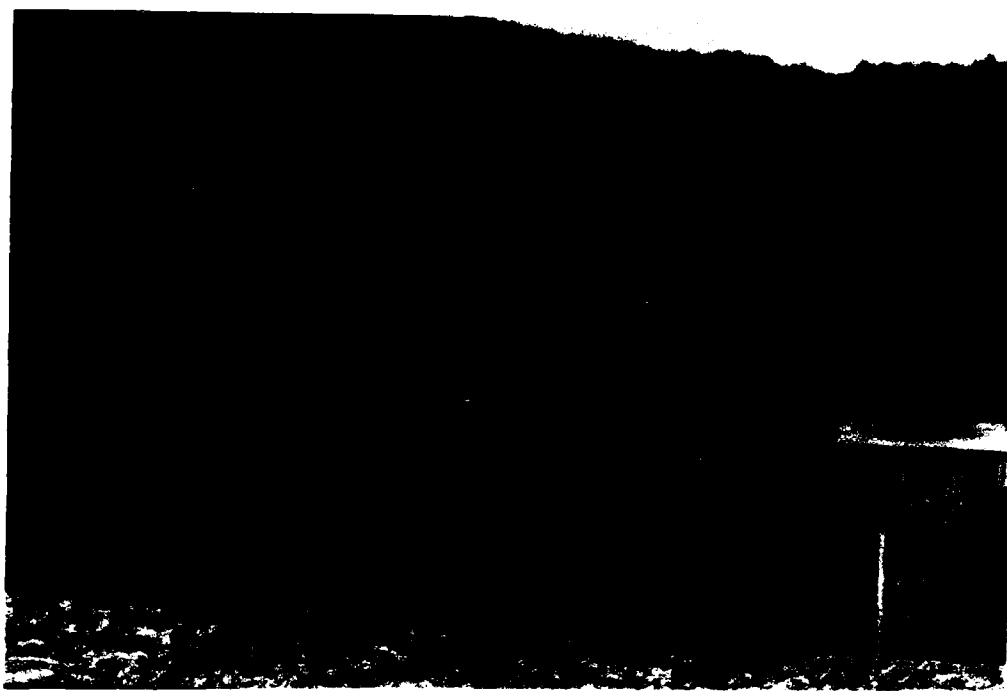
ISCHUA CREEK WATERSHED DAM #2
 NY00560

PHOTO ORIENTATION PLAN

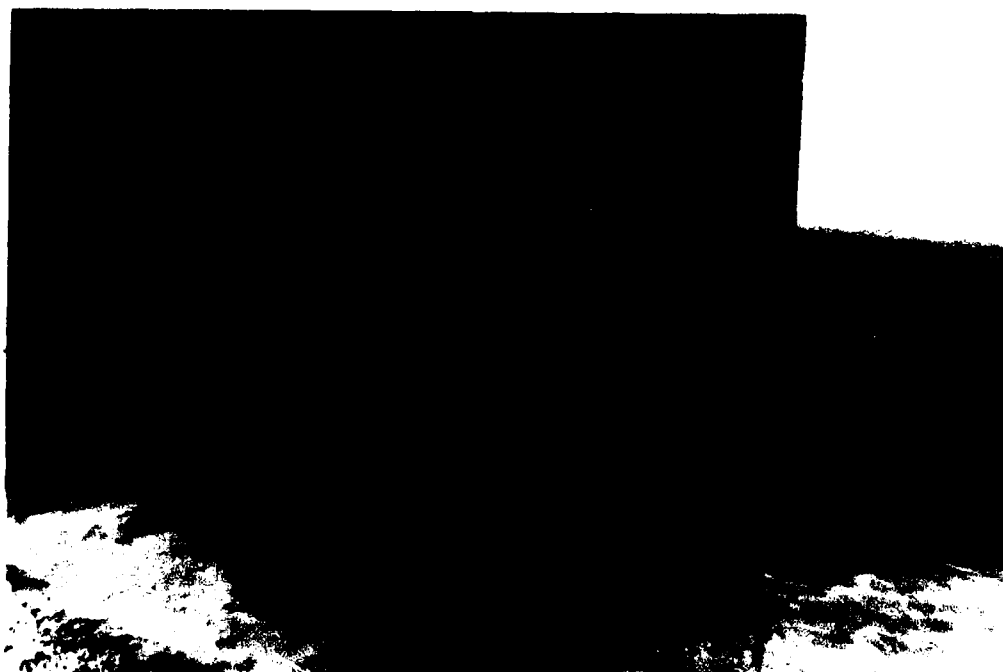
ERDMAN, ANTHONY, ASSOCIATES
 CONSULTING ENGINEERS & PLANNERS

DATE
 MAY 1981

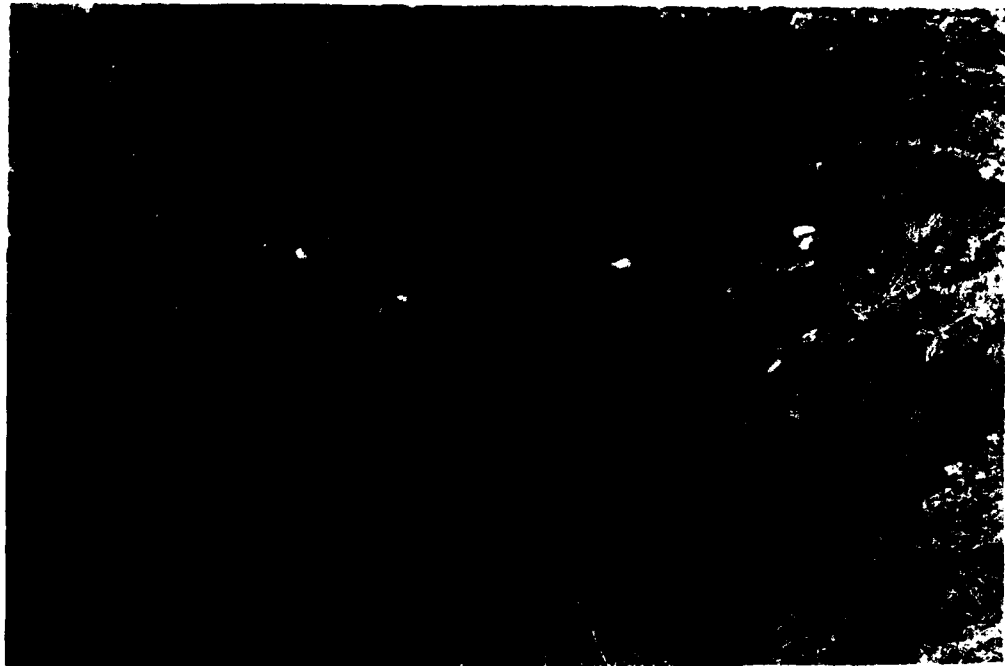
C-1



1. Principal spillway inlet structure and impoundment



2. Principal spillway low stage inlet showing trash rack



3. Principal spillway outlet pipe, and plunge pool



4. Downstream channel



5. Crest of dam



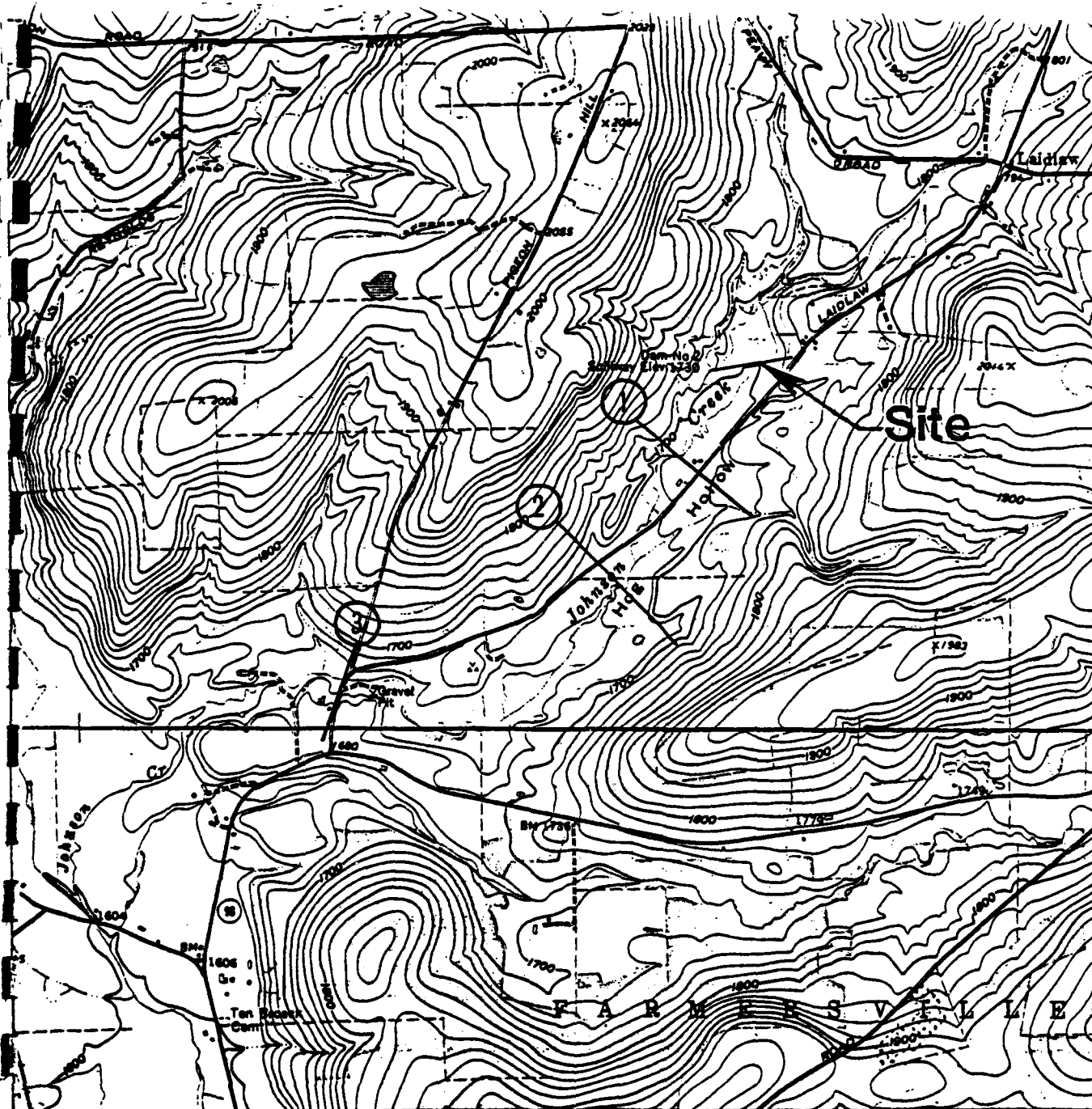
6. Emergency spillway

APPENDIX D

HYDRAULIC AND HYDROLOGIC COMPUTATIONS

APPENDIX D

	<u>PAGE</u>
Cross Section Location Plan	D-2
HEC-1 Dam Safety Version Computer Program - Input	D-3
HEC-1 Dam Safety Version Computer Program - Output	D-4
Supporting Calculations	
• Hydrology	D-11
• Spillway Hydraulics	D-13
• Downstream Channel Routing	D-21



Ischua Creek Watershed
Dam No. 2

CROSS SECTION LOCATION PLAN

Scale: 1"=2000'

DA, EFF, ENCL 10M

OK, SLU, SPECIM
CENR, PROJECT NUMBER
R0122-20.74

INPUT FILE ? NY560
.....
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION JULY 1978
LAST MODIFICATION 26 FEB 79

PREVIEW OF SEQUENCE OF STRFAM NETWORK CALCULATIONS
RUNOFF HYDROGRAPH AT INFLOW
ROUTE HYDROGRAPH TO UTFLOW 1
ROUTE HYDROGRAPH TO 2
ROUTE HYDROGRAPH TO 3
END OF NETWORK

.....
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION JULY 1978
LAST MODIFICATION 26 FEB 79
.....

RUN DATE: 5/12/
TIME: 4:07 PM

ANALYSIS OF DAM OVERTOPPING USING RATIOS OF PMF DAM NY 560
HYDROLOGIC-HYDRAULIC ANALYSIS OF SAFETY OF ISCHUA CREEK DAP NO.2
RATIOS OF PMF ROUTED THROUGH THE RESERVOIR AND DOWNSTREAM

NO	MHR	MMIN	IDAY	IHR	IMIN	METRC	IPLT	IFRT	INSTAN
100	0	15	0	0	0	0	-1	4	0
			JOPFK	MWT	LROPT	TRACE			
			5	0	0	0			

MULTI-PLAN ANALYSES TO BE PERFORMED
NPLAN= 1 MRTIO= 6 LRTIO= 1
RTIOS= 0.20 0.40 0.50 0.60 0.80 1.00

..... SUR-AREA RUNOFF COMPUTATION

CALCULATION OF INFLOW HYDROGRAPH TO RESERVOIR
ISTAG ICOMP IECON ITAPE JPLT JVRT INAPE ISTAGE IAUTO
INFLOW 0 0 0 0 0 0 0 0 0 0

HYDROGRAPH DATA
INVDG IUNG TAREA SNAP TRSDA TRSPC RATIO ISNOV JSAME LCCAL
1 1 2.00 0.00 2.00 0.00 0.000 0 0 1 1 0 0
PRECIP DATA

OK, SEG RHEC108

PAGE 000

PEAK OUTFLOW IS 1103. AT TIME 43.25 HOURS
 PEAK OUTFLOW IS 2538. AT TIME 42.50 HOURS
 PEAK OUTFLOW IS 3165. AT TIME 42.50 HOURS
 PEAK OUTFLOW IS 3815. AT TIME 42.50 HOURS
 PEAK OUTFLOW IS 4186. AT TIME 42.50 HOURS
 PEAK OUTFLOW IS 4371. AT TIME 42.50 HOURS

DAM DATA
 OPEL 5.000 CKPD DAMID
 1352 2.7 1.5 1.0

HYDROGRAPH ROUTING

CHANNEL ROUTING -MOO PULS RESERVOIR 1
 IRTAG 1 ICOMP 1 ICON IYAPE JPLI JPRI
 0 0 0 0 0 0
 ROUTING DATA
 LOSS 0.000 AVG 0.000 IRES ISAME IOPT ITPP
 0.0 0.000 0.000 1 0
 NSTPS NSTDL LAG AHSKK X YSK ZSPRA
 1 0 0 0.000 0.000 0.000 0.000

NORMAL DEPTH CHANNEL ROUTING

GN(1) GN(2) GN(3) ELMVT ELMAX RLNTH SEL
 0.0600 0.0400 0.0600 1680.0 1720.0 1730.0 0.00000

CROSS SECTION COORDINATES--STA+ELEV,STA+ELEV--ETC

0.00 1720.00 700.00 1700.00 1180.00 1683.00 1192.50 1680.00 1207.50 1680.00
 1220.00 1683.00 1680.00 1700.00 1750.00 1720.00

STORAGE	0.00	1.99	6.67	19.59	41.41	72.13	111.76	168.30	217.74	281.00
	359.15	441.00	532.00	629.77	734.94	847.60	967.73	1095.34	1230.43	1373.01
OUTFLOW	0.00	219.90	1009.19	3039.23	6978.90	13395.26	22769.53	35621.30	52326.10	73291.17
	99373.50	130911.80	167695.50	209954.59	257924.97	311843.81	371948.19	438474.06	511655.01	591721.00
STAGE	1680.00	1682.11	1684.21	1686.32	1688.42	1690.53	1692.63	1694.74	1696.84	1698.95
	1701.05	1703.16	1705.26	1707.37	1709.47	1711.58	1713.68	1715.79	1717.89	1720.00
FLOW	0.00	219.90	1009.19	3039.23	6978.90	13395.26	22769.53	35621.30	52326.10	73291.17
	99373.50	130911.80	167695.50	209954.59	257924.97	311843.81	371948.19	438474.06	511655.01	591721.00

ON. SEG SPECJOB

MAXIMUM STAGE IS 1665.0
MAXIMUM STAGE IS 1665.5
MAXIMUM STAGE IS 1666.3
MAXIMUM STAGE IS 1666.6

HYDROGRAPH ROUTING
CHANNEL ROUTING
TECON
ISAE
ROUTING DATA
AVG
RES
ISAE
LOPT
IPMP
MSTPS
LAG
ANSKR
X
Y
Z
ISPR

NORMAL DEPTH CHANNEL ROUTING

0.000 0.000 0.000 1644.0 1644.0 1644.0 365.00 1644.00 300.00 1644.00
0.00 5.58 807.94 1618 40.96 82.34 140.22 214.60 365.49 413.88 531.55
667.58 807.94 956.87 1114.29 1280.21 1454.61 1637.50 1628.88 2026.76 2237.12

CROSS SECTION COORDINATES--STA,ELEV,S1,ELEV--ETC

0.60 1688.88 189.00 1660.00 352.50 1647.00 365.00 1644.00 300.00 1644.00
392.50 1647.00 685.00 1660.00 873.00 1680.88

STORAGE 0.00 5.58 807.94 1618 40.96 82.34 140.22 214.60 365.49 413.88 531.55
667.58 807.94 956.87 1114.29 1280.21 1454.61 1637.50 1628.88 2026.76 2237.12
OUTFLOW 0.00 110.14 474.72 1400.47 3219.22 6216.27 10641.12 16721.97 24663.98 35821.98
48272.22 63386.02 80600.55 99961.20 121518.61 145326.84 171442.03 199921.81 230824.66 262205.56
STAGE 1649.08 1645.89 1647.79 1649.68 1651.58 1653.47 1655.37 1657.26 1659.16 1661.05
1662.95 1664.84 1666.73 1668.63 1670.52 1672.42 1674.31 1676.21 1678.10 1680.00
FLOW 0.00 110.14 474.72 1400.47 3219.22 6216.27 10641.12 16721.97 24663.98 35821.98
48272.22 63386.02 80600.55 99961.20 121518.61 145326.84 171442.03 199921.81 230824.66 262205.56

MAXIMUM STAGE IS 1649.8
MAXIMUM STAGE IS 1650.8
MAXIMUM STAGE IS 1651.5
MAXIMUM STAGE IS 1651.9

DAM SECTION

MAXIMUM STAGE

MAXIMUM STAGE

PEAK FLOW AND STORAGE (CMD OF PIPELINES) SUMMARY FOR MULTIPLE PLAN RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
AREA IN SQUARE MILES (SQUARE KILOMETERS)

RATIOS APPLIED TO PLAN RATIO

OPERATION	STATION	AREA	PLAN RATIO	RATIO 2	RATIO 3	RATIO 4	RATIO 5	RATIO 6
HYDROGRAPH AT INFLOW	2.00	1291	2633	328	374	565	457	1100
	0.25	1571	7113	9192	10779	12271	12841	13800
ROUTED TO DIFLOW	2.00	1183	2338	3165	3815	5166	4391	1100
	0.25	1231	7188	8963	10003	11300	11701	12300
ROUTED TO C	2.00	1183	2333	3161	3806	5077	4302	1100
	0.25	1231	7172	8950	10000	11300	11701	12300
ROUTED TO	2.00	1183	2334	3162	3807	5089	4307	1100
	0.25	1231	7176	8953	10001	11300	11701	12300
ROUTED TO	2.00	1183	2331	3160	3796	5073	4296	1100
	0.25	1231	7170	8947	9997	11299	11699	12299

SUMMARY OF DAM SAFETY ANALYSIS

PLAN	ELEVATION STORAGE	INITIAL VALUE	SPILLWAY CREST	MAXIMUM STORAGE	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	CURATION OVER TOP HOURS	TIME OF FAILURE HOURS
1	1731.00	1721.00	1729.50	215	0.00	586	1183	0.00	0.00
2	1731.00	1721.00	1729.50	215	0.00	586	1183	0.00	0.00
3	1731.00	1721.00	1729.50	215	0.00	586	1183	0.00	0.00
4	1731.00	1721.00	1729.50	215	0.00	586	1183	0.00	0.00
5	1731.00	1721.00	1729.50	215	0.00	586	1183	0.00	0.00
6	1731.00	1721.00	1729.50	215	0.00	586	1183	0.00	0.00
7	1731.00	1721.00	1729.50	215	0.00	586	1183	0.00	0.00
8	1731.00	1721.00	1729.50	215	0.00	586	1183	0.00	0.00
9	1731.00	1721.00	1729.50	215	0.00	586	1183	0.00	0.00
10	1731.00	1721.00	1729.50	215	0.00	586	1183	0.00	0.00
11	1731.00	1721.00	1729.50	215	0.00	586	1183	0.00	0.00
12	1731.00	1721.00	1729.50	215	0.00	586	1183	0.00	0.00
13	1731.00	1721.00	1729.50	215	0.00	586	1183	0.00	0.00
14	1731.00	1721.00	1729.50	215	0.00	586	1183	0.00	0.00
15	1731.00	1721.00	1729.50	215	0.00	586	1183	0.00	0.00
16	1731.00	1721.00	1729.50	215	0.00	586	1183	0.00	0.00
17	1731.00	1721.00	1729.50	215	0.00	586	1183	0.00	0.00
18	1731.00	1721.00	1729.50	215	0.00	586	1183	0.00	0.00
19	1731.00	1721.00	1729.50	215	0.00	586	1183	0.00	0.00
20	1731.00	1721.00	1729.50	215	0.00	586	1183	0.00	0.00

PLAN 1 STATION 1

OK, SEE #NLC10A

RATIO	FLOW,CFS	STAGE,FT	HOURS
0.20	1103.	1684.3	43.50
0.40	2533.	1685.8	42.75
0.50	3161.	1686.4	42.75
0.60	3806.	1686.7	42.50
0.80	5897.	1687.4	42.50
1.00	6382.	1688.1	42.50

PLAN 1 STATION 2

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.20	1102.	1663.6	43.50
0.40	2534.	1664.6	42.75
0.50	3162.	1665.0	42.75
0.60	3887.	1665.5	42.75
0.80	5889.	1666.3	42.50
1.00	6367.	1666.6	42.75

PLAN 1 STATION 3

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.20	1661.	1649.0	44.00
0.40	2501.	1650.8	43.00
0.50	3128.	1651.5	43.00
0.60	3776.	1651.9	43.00
0.80	5843.	1652.7	43.00
1.00	6326.	1653.5	42.75

DATE 3/17/81

ERDMAN, ANTHONY, ASSOCIATES

SHEET 2 OF 2

RRA

DATE 3/17/01

SUBJECT DAM 560 HYDROLOGY

SUB-SHEET NO. 2

OWNER

PROJECT NAME ISCHIA CREEK WATERSHED #2 (80166-00.04)

$$T_p = C_T (L L_{ca})^{0.3}$$

$$C_T = 2.00 \checkmark$$

$$T_r = \frac{T_p}{5.5}$$

$$C_p = 0.63 \checkmark$$

$$T_{PR} = T_p + 0.25 (T_R - T_r)$$

$$L = 12280 \text{ ft} = 2.33 \text{ mi} \checkmark$$

$$L_{ca} = 5550 \text{ ft} = 1.05 \text{ mi} \checkmark$$

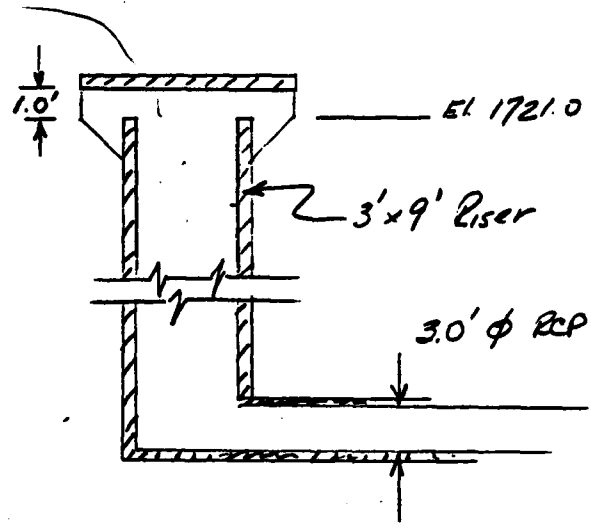
$$T_p = 2 (2.33 \times 1.05)^{0.3} = 2.62 \text{ hr} \checkmark$$

$$T_r = \frac{2.62}{5.5} = 0.48 \text{ hr} \implies T_R = 0.5 \text{ hr} \checkmark$$

$$t_{PR} = 2.62 + 0.25 (0.5 - 0.48) = 2.63 \text{ hr} \checkmark$$

Service Spikeway

Assume that the 3.0' ϕ RCP is the control & develop an eqn. of the form $Q = CA\sqrt{2g}H^x$ to describe the flow.



From Design Report:

- $Q_s = 146 \text{ cfs @ El. } 1729.0$
- $Q_s = 0 \text{ cfs @ El. } 1721.0$

$$A_o = \pi (1.5)^2 = 7.1 \text{ ft}^2$$

Determine C_o from $Q_s = 146 \text{ cfs}$ & 0 cfs .

$$H = 1729.0 - 1721.0 = 8.0'$$

$$C_o = \frac{Q_s}{A_o \sqrt{2g} H_o} = \frac{146 \text{ cfs}}{(7.1 \text{ ft}^2) \sqrt{2(32.2)(8.0)}} = 0.91$$

Elev.	H_o	Q
1725	4.0	104 ✓
1729	8.0	147 ✓
1730	9.0	156 ✓
1731	10.0	164 ✓
1732	11.0	172 ✓
1733	12.0	180 ✓
1734	13.0	187 ✓
1735	14.0	194 ✓
1736	15.0	201 ✓
1737	16.0	207 ✓
1738	17.0	214 ✓
1739	18.0	220 ✓
1740	19.0	226 ✓

$$Q_s = 0.91 (7.1 \text{ ft}^2) (\sqrt{2 \times 32.2}) H_o^{0.5}$$

$$= 51.85 H_o^{0.5} \checkmark$$

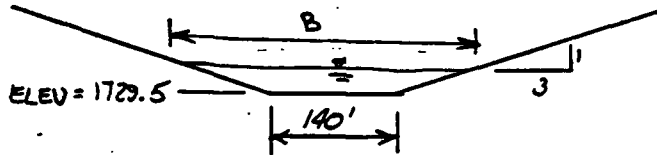
1735.1	14.1	194.70
1735.2	14.2	195.39

EMERGENCY SPILLWAY

Ref: "Brater & King" Table B-7 page B-59
 "Determining The Discharge Q of A Trapezoidal Channel when Flow Is At Critical Depth"

Check to see if flow goes through critical depth. Determine critical slope for depths of flow $y = 1'$. If spillway slope $>$ critical slope flow goes through critical depth and Table B-7 holds.

$$\frac{Q^2}{g} = \frac{A^3}{B} \quad Q_c = \sqrt{\frac{gA^3}{B}}$$



EMERGENCY SPILLWAY SECTION
 $(S_c = 0.026)$

For $y = 1'$

$$A = 140'(1') + 2'(\frac{1}{2} \times 3' \times 1') = 143 \text{ ft}^2$$

$$B = 140 + 2(3 \times 1') = 146 \text{ ft}$$

$$Q_c = \sqrt{\frac{32.2 (143 \text{ ft}^2)^3}{146 \text{ ft}}} = 803 \text{ cfs}$$

$$K = \frac{1.49}{n} AR^{2/3} = \frac{1.49}{0.035} (143 \text{ ft}^2) \left(\frac{143 \text{ ft}^2}{146.32 \text{ ft}}\right)^{2/3} = 5995$$

$$S_c = \left(\frac{Q_c}{K}\right)^2 = \left(\frac{803 \text{ cfs}}{5995}\right)^2 = 0.018$$

spillway slope $>$ critical slope \therefore
 $0.026 > 0.018$

\therefore Flow goes through critical depth for $y = 1 \text{ ft}$ and also for $y > 1 \text{ ft}$. Use Table B-7 "Brater & King"

KRA

DATE 3/20/81

ERDMAN, ANTHONY, ASSOCIATES

SHEET 5 OF 12

RWB

DATE 3/31/81

SUBJECT DAM 560 HYDRAULICS

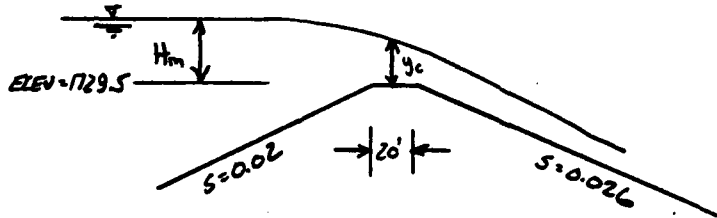
SUB-SHEET NO. 3

OWNER

PROJECT NAME DAM INSPECTIONS (E0166-00.04)

$Z = 3/1 = 3.0$
 $b = 140 \text{ ft}$

$Q_E = C_2 b H_m^{1.5}$



H_m	$\frac{H_m}{b}$	C_2	Q_E	ELEV.
0.0	0.0	0	0	1729.5
0.5	0.011	3.11	154	1730.0
1.5	0.032	3.15	810	1731.0
2.5	0.054	3.20	1771	1732.0
3.5	0.075	3.24	2970	1733.0
4.5	0.096	3.28	4383	1734.0
5.5	0.118	3.34	6031	1735.0
6.5	0.139	3.38	7842	1736.0
7.5	0.161	3.42	9834	1737.0

ISCHUA CREEK DAM #2
 \$A PAREA RESEVOIR SURFACE AREA
 \$E RELEA R.

REFF. U.S. DEPT. OF A.S.C.S AS BUILT PLANS DRW. NY-802-E
 SCALE 1" = 200' x 1/2 REDUCTION : 1" = 400'

$$\text{Eq. } \frac{\text{in}^2 \times (400 \text{ ft})^2}{\text{in}^2} \times \frac{1 \text{ AC}}{43,560 \text{ ft}^2} = \text{AC.}$$

ELEV. 1706.5 = 7.0 AC GIVEN
 ELEV. 1725

$$7.05 \text{ in}^2 \times \frac{(400 \text{ ft})^2}{\text{in}^2} \times \frac{1 \text{ AC}}{43,560 \text{ ft}^2} = 25.90 \text{ AC.}$$

ELEV. 1729.0 = 32.5 AC GIVEN

ELEV. 1730

$$9.23 \text{ in}^2 \times \frac{(400 \text{ ft})^2}{\text{in}^2} \times \frac{1 \text{ AC}}{43,560 \text{ ft}^2} = 33.90 \text{ AC.}$$

ELEV. 1735

$$11.10 \text{ in}^2 \times \frac{(400 \text{ ft})^2}{\text{in}^2} \times \frac{1 \text{ AC}}{43,560 \text{ ft}^2} = 40.77 \text{ AC.}$$

ELEV. 1740

$$13.7 \text{ in}^2 \times \frac{(400 \text{ ft})^2}{\text{in}^2} \times \frac{1 \text{ AC}}{43,560 \text{ ft}^2} = 50.32 \text{ AC.}$$

* USE stage-storage relationship from Design Report
 see sheet 7/12

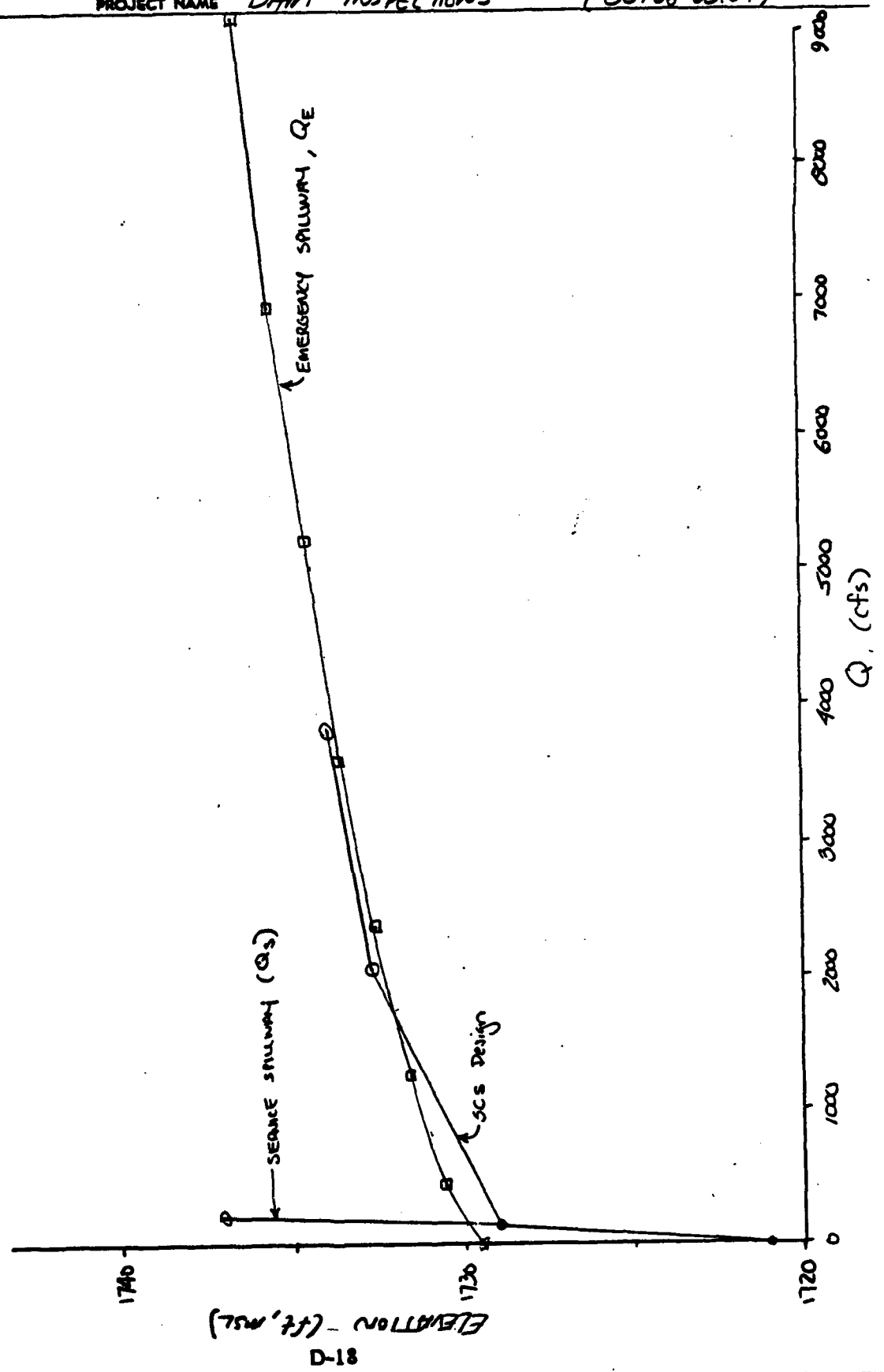
Total Spillway Discharges ($Q_s + Q_e$)

Elev.	$Q_s + Q_e$	Reservoir Surface Area	
1721.0	0	22 Acres	✓
1725.0	104	25.9 "	✓
1729.0	147	32.5 "	✓
1730.0	310	33.9 "	✓
1731.0	974	—	✓
1732.0	1943	—	✓
1733.0	3150	—	✓
1734.0	4570	—	✓
1735.0	6225	40.77 "	✓
1736.0	8043	—	✓
1737.0	10,041	—	✓
1738.0		—	
1739.0		—	
1740.0		50.32 "	✓

Stage - Storage Relationship

<u>ELEV.</u>	<u>Storage (AF)</u>	
1706.5	25	} From design report
1721.0	215	
1729.0	440	
1732.7	555	
1734.0	603	
1736.0	677	- extrapolated.

SPILLWAY RATING CURVE - DAM 560



DATE 9/22/81 ERDMAN, ANTHONY, ASSOCIATES SHEET 9 OF 12
D 9/KH DATE 9/22/81 SUBJECT DAM #510 - Hydraulics SUB-SHEET NO. 7
OWNER PROJECT NAME DAM INSPECTIONS (80166-00.0A)

Seepage DATA

DAM Height = 1735.2

Discharge Coefficient (C) = 2.7

Exponent (E) = 1.5

Length of DAM Crest = 1400'

Emergency Spillway Capacities

FLOOD	Q _{total}	ELEV.	Q _{res}	A	V	Comments
PMF	6391	1735.09	6194	634	9.8	78.0 i. erosion
1/2 PMF	3165	1733.01	2970	403	7.4	< 80 i. no erosion

b = 140

Assume $y/b < 0.02 \Rightarrow y_n = 0.789 \left(\frac{Qn}{b S^{3/2}} \right)^{0.6}$
 $y_n = 0.789 \left(\frac{2970 (0.06)}{140 (0.026)^{3/2}} \right)^{0.6} = 2.72' \quad y/b = \frac{2.72'}{140} = 0.019 < 0.02 \quad \underline{OK}$

$A = (2.72')(140') + \frac{2}{3} \left(\frac{2}{3} (2.72')(3)(2.72') \right) = 403 \text{ ft}^2$

$V = \frac{Q}{A} = \frac{2970}{403} = 7.4 \text{ ft/sec}$

1/2 PMF

Elev	Q	
1735	6031	$Q_{res} = 6031 + .09(7842 - 6031) = 6194 \text{ cfs}$
1736	7842	

$y_n = 0.789 \left(\frac{6194 (0.06)}{140 (0.026)^{3/2}} \right)^{0.6} = 4.24' \quad y/b = 0.03 > 0.02 \quad \underline{N.G.}$

Ref: Fund. of Open Channel Hydraulics, Table 103E, pg. 6

$\frac{Q(n)}{(b^{4/3} S^{3/2})} = \frac{6194 (0.06)}{(140)^{4/3} (0.026)^{3/2}} = 0.00436 \Rightarrow y_n = 4.16'$

$A = (4.16')(140') + \frac{2}{3} \left(\frac{2}{3} (4.16')(3)(4.16') \right) = 634 \text{ ft}^2$

$V = \frac{Q}{A} = \frac{6194}{634} = 9.8 \text{ ft/sec}$

P.R.P. DATE 3/23/81 ERDMAN, ANTHONY, ASSOCIATES SHEET 11 OF 12

B.R. DATE 3/24/81 SUBJECT DAM 560 ROUTING SUB-SHEET NO. 1

OWNER PROJECT NAME DAM INSPECTION 80166-00.04

B.R. 4/13/81
 XEA 4/13/81
 ISCHUA CREEK DAM #2

DAM DATA FROM AS-BUILT PLAN

DAM TOP ELEV.	1736.4	1720	1700	1683	1680	1680	1683	1700	1720
DAM INV. ELEV.	1694.0	0	700	1180	1192.5	1207.5	1220	1600	175

REACH 1 LENGTH = 1730'

CROSS SECT	1720	1700	1680	1680	1700	1720
	0	700	1145	1205	1600	1750

(V6) 6 RLNTA

(Y1) 1-10 X&Y

SLOPE: DAM INV. - REACH 3 INV. = h ; L = SLOPE

$$1694.0 - 1680 = 14 ; 1730 = 0.008 = S$$

(V6) 7 SEL

REACH 2 LENGTH = 2200'

CROSS SECT.	1720	1700	1680	1678	1680	1660	1660	1680	1720
	0	100	200	350	550	1145	1205	1400	2050

SLOPE: REACH 3 INV. - REACH 4 INV. = h ; L = SLOPE

$$1680 - 1660 = 20 ; 2200 = 0.009 = S$$

REACH 3 LENGTH = 5600'

CROSS SECT.	1681	1680	1660	1658	1658	1660	1681
	0	690	870	1055	1070	1375	1563

SLOPE: REACH 4 INV. - REACH 5 INV. = h ; L = SLOPE

$$1660 - 1644 = 16 ; 5600 = 0.00285 = S$$

KPA

DATE 4/13/81

ERDMAN, ANTHONY, ASSOCIATES

SHEET 12 OF 12

D.B.R.

DATE 4/13/81

SUBJECT DAM 560 - CHANNEL SECTIONS SUB-SHEET NO. 2

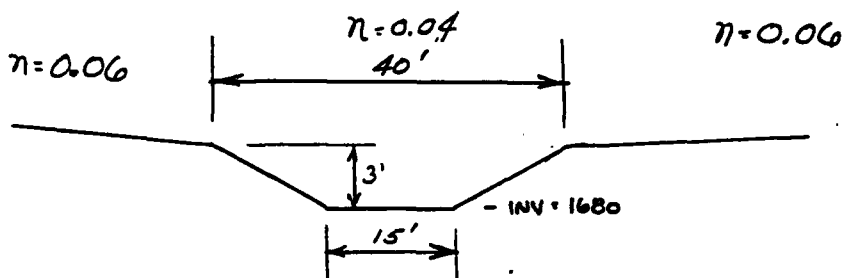
2

OWNER

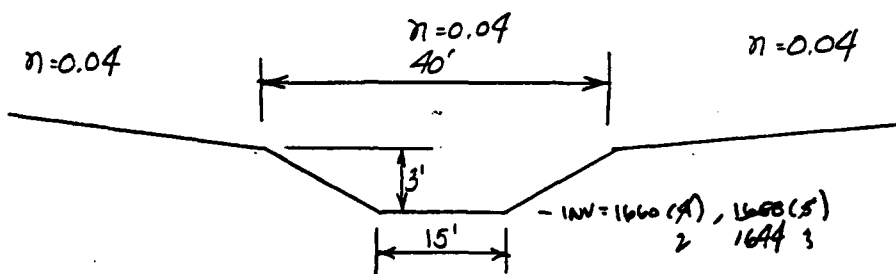
PROJECT NAME DAM INSPECTIONS (E0166.04)

DAM 560 - CHANNEL SECTIONS

SECTION 3:



SECTIONS 4 & 5:



APPENDIX E

INFORMATION AS CONTAINED IN
THE NATIONAL INVENTORY OF DAMS

INVENTORY OF DAMS

FORM ITEM	NOMENCLATURE	DATA	NOMENCLATURE	DATA
1	ID	NY00360	29	D/S HAZARD
2	DIVISION	WAD	30	CREST LENGTH
3	STATE	33	31	SPILLWAY TYPE
4	COUNTY	009 (CATTARAUGUS)	32	SPILLWAY WIDTH
5	CONGR. DIST.	39	33	MAX DISCHARGE
6	2ND STATE		34	VOLUME
7	2ND COUNTY		35	POWER INSTALLED
8	2ND CONGR		36	POWER PROPOSED
9	OFF. DAM NAME	ISCHUA CREEK WATERSHED DAM #2	37	NO. OF LOCKS
10	LATITUDE	42-23.4	38-45	LOCK LEM/HID
11	LONGITUDE	078-25.8	86	OWNER NAME
12	REPORT DATE	8/7/97/18.	47	ENGINEERING
13	POPULAR NAME	NONE	48	CONSTRUCTION
14	FOUND. NAME	UNKNOWN	49	REG. DESIGN
15	REGION	05	50	REG. CONST.
16	BASIN	01	51	REG. OPER.
17	RIVER/STREAM	JOHNSON CREEK	52	REG. MAINT.
18	D/S CITY/TOWN	FRANKLYNVILLE	53	INSPECTOR
19	DISTANCE	000	54	INSP. DATE
20	POPULATION	0000250	55	INSP. AUTH.
21	TYPE OF DAM	RE	56	(SEE BELOW)
22	YEAR COMPLETED	1961	57	INSP. UNIT.
23	PURPOSES	C	58	UNSAFE
24	STR. HEIGHT	0055 42	59	URGENCY
25	MVD. HEIGHT	0066 56	60	INSP. COMPL.
26	MAX CAPACITY	0000000 647	61	RPT. APPR.
27	NORMAL CAP.	00000025	62	GOV. NOTIF.
27A	CORPS DIST.	000	63	INSPECTOR
27B	OWNER CODE	N	64	GOV. RPT.
27C	FED. REGULATED	N	65	DEFICIENCY
27D	PVT. OR FED.	N		
27E	SEC. 17H	N		
27F	VERIFY DATE	80/09/25.		

ISCHUA CREEK COUNTY Small Watershed
Protection District

CATTARAUGUS COUNTY

DEC DEC DEC

EN CON LAM SECT 15-0507

02 APR 81

15 MAY 81

YC

OV

2A REMARK 1-10-25-2077 2A-UNKNOWN MINIMUM USED

2B REMARK 21-0000 THE DAM NUMBER IS 33-0000-0000

2C-EMERGENCY SPILLWAY; PRINCIPAL SPILLWAY IS A 36 IN. CONDUIT WITH 9.0 FT. X 3.0 FT. RIVER.

2D-EMERGENCY AND PRINCIPAL SPILLWAY.

2E-REMARK

32 - TOTAL OF EMERGENCY AND PRINCIPAL SPILLWAY.

END

DATE
FILMED

11-8

DTIC